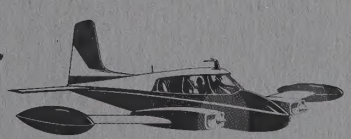
Preliminary Instructions

for

ARC TYPE R-33A

RECEIVER



Aircraft Radio Corporation

Boonton, New Jersey

Preliminary Instructions

for

ARC TYPE R-33A RECEIVER

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WARRANTY

Aircraft Radio Corporation (ARC) warrants each item of new equipment manufactured by it to be free from defects in material and workmanship under normal service use for which intended. ARC obligates itself under this warranty to replace or repair (at ARC discretion), at its factory, any ARC equipment, or major unit thereof (excluding vacuum tubes and transistors), which shall within one year after delivery to the original purchaser thereof be returned, transportation charges prepaid, to ARC with a statement from an authorized ARC Distributor or Dealer establishing the date of such delivery, which ARC examination shall disclose to have been defective in manufacture. This warranty shall not apply to any equipment, or major unit thereof, which, in the judgment of ARC, has been repaired or altered in any way so as adversely to affect its performance or reliability, or which has been subject to misuse, negligence or accident. This warranty is in lieu of all other guaranties or warranties express or implied. The obligation and responsibility of ARC for or with respect to defective equipment shall be limited to that expressly provided herein and ARC shall not be liable for consequential or other damage or expense whatsoever therefor or by reason thereof.

ARC reserves the right to make changes in design or additions to or improvements in its equipment without obligation to install such additions or improvements in equipment theretofore manufactured.

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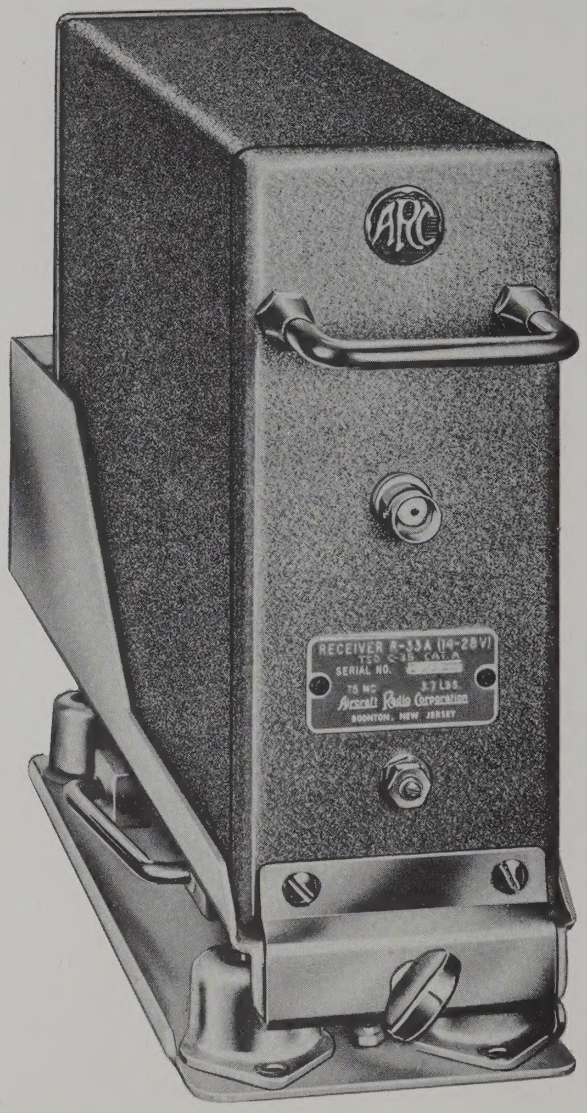

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Figure 1-1. ARC Type R-33A Receiver with ARC Type M-41B Mounting

SECTION I

GENERAL INFORMATION

1-1. INTRODUCTION.

This instruction book contains installation, operation, and maintenance information for the ARC Type R-33A Receiver.

1-2. PURPOSE.

The ARC Type R-33A Receiver (Figure 1-1) provides visual and aural indications of 75-megacycle airway and ILS marker beacon signals, amplitude-modulated with 400-, 1300-, or 3000-cps tones.

1-3. SPECIFICATIONS.

Frequency:	75 mc, fixed tuned
R-f Input:	52 ohms
Sensitivity:	200 "hard"[1] microvolts in HI position of HI-LO sensitivity switch. 2000 "hard" microvolts in LO position of HI-LO sensitivity switch
Indications:	Aural and three-light visual
Audio Output:	200 mw into 300-ohm load
Input Current:	Approximately 0.35 ampere at 27.5 or 13.75 volts dc (at no-signal condition)
Mounting:	ARC Series 40 Mounting
Weight:	3.7 pounds
Dimensions:	2-1/2 in. wide, 6 in. high, 12-1/2 in. deep
Environmental Limits:	Meets requirements of FAA TSO C-35, Category A

1-4. ACCESSORIES SUPPLIED.

Table 1-1 lists the accessories supplied with the R-33A Receiver.

TABLE 1-1. ACCESSORIES SUPPLIED

Qty	Name	ARC Part No.
1	Connector Kit S2, consisting of:	22424
1	Connector	21766
1	Plate	22423
6	Sems, fillister head, 4-40 thread by 1/4 in. long	524(1/4)
2	Screw, machine, flat head, 6-32 thread by 5/16 in. long	146(5/16)
2	Stud, snapslide	22237
20 ft	Cable, coaxial (RG-58/U)	11318
2	Connector, BNC (UG-88C/U)	11337
1	Receptacle, BNC (UG-290/U)	11338
1	Instruction Book	—

[1] "Hard" microvolts are defined as open-circuit microvolts of a 50-ohm signal source.

1-5. ACCESSORIES REQUIRED BUT NOT SUPPLIED.

Table 1-2 lists the accessories required, but not supplied, for installation and operation of the R-33A Receiver. In addition to the items listed in the table, an antenna is needed (see paragraph 2-1), and a cable assembly must be fabricated from individual wires (not supplied) and the ARC-21766 connector contained in Connector Kit S2 shipped with the receiver. Recommended wire sizes for the cable assembly are identified in Figure 2-2.

TABLE 1-2. ACCESSORIES REQUIRED BUT NOT SUPPLIED

Qty	Item	ARC Part No.
1	Mounting, ARC Series 40[1]	—
1	Headset, 600 ohm	11935
1	Control Unit, ARC Type C-83A[2]	22360

[1]For single-unit installation, an ARC Type M-41B Mounting is used.
[2]The ARC Type C-83A Control Unit is an edge-lighted unit designed for aircraft having console mounting facilities. The C-83A contains a combination on-off switch and volume control potentiometer, three indicator lights, and a high-low sensitivity switch.

1-6. DESCRIPTION.

The ARC Type R-33A Receiver is an all-transistor marker beacon receiver. It provides aural as well as three-light visual indication upon reception of 75-mc signals amplitude-modulated at 400, 1300, or 3000 cps. The r-f sensitivity of the receiver can be internally adjusted to accomodate various types of antennas. An external switch (not supplied) is used to select either of two r-f sensitivity levels, each of which is internally adjustable. The triggering level for each indicator light can also be adjusted internally.

The R-33A Receiver has an aural output of 200 mw into a 300-ohm load. This aural output level is controlled by a potentiometer on the front cover of the receiver, and also by an external audio-level control, if desired.

Visual indications of marker beacon signals are provided by three lamps (not part of the R-33A). The receiver has one lamp output lead for each of the three marker beacon modulating frequencies: 400 cps for ILS outer markers (blue lamp); 1300 cps for ILS middle markers (amber lamp); and 3000 cps for "Z" markers, airway "Fan" markers, and ILS boundary markers (white lamp). Each lamp receives power from the aircraft's primary d-c power source through a transistor switch in the receiver.

Modular construction is used for the R-33A Receiver. The chassis, enclosed by an aluminum dust cover, supports a printed-circuit board and seven plug-in modules. The components of each module are mounted on a printed-circuit board supported by an aluminum frame. These frames are, in turn, supported by the chassis. Jacks on one edge of each modular board make the necessary electrical connections with pins on the chassis printed-circuit board. The R-33A requires an ARC Series 40 Mounting for proper installation. For single-unit installation, the ARC Type M-41B Mounting is used. A clamp at the front of the mounting secures the receiver in place.

Except for the antenna connection, all input and output connections are made through a single connector mounted on the rear of the chassis. Connection to the antenna is made through a BNC connector mounted on the front panel of the receiver.

1-7. BASIC PRINCIPLES OF OPERATION.

Figure 1-2 is a block diagram of the R-33A Receiver. The receiver is a double-conversion superheterodyne with intermediate frequencies of 11.5 and 1.7 mc.

A 75-mc bandpass filter with three tuned circuits couples the antenna to a diode mixer. The selectivity and attenuation provided by this filter minimize interference by high-level television signals at adjacent frequencies. A crystal-controlled oscillator injects a 63.5-mc signal into the diode mixer. The output of the diode mixer is coupled through an 11.5-mc double-tuned circuit to a transistor mixer. Another crystal-controlled oscillator injects a 9.8-mc signal into the transistor mixer to produce the final intermediate frequency of 1.7 mc.

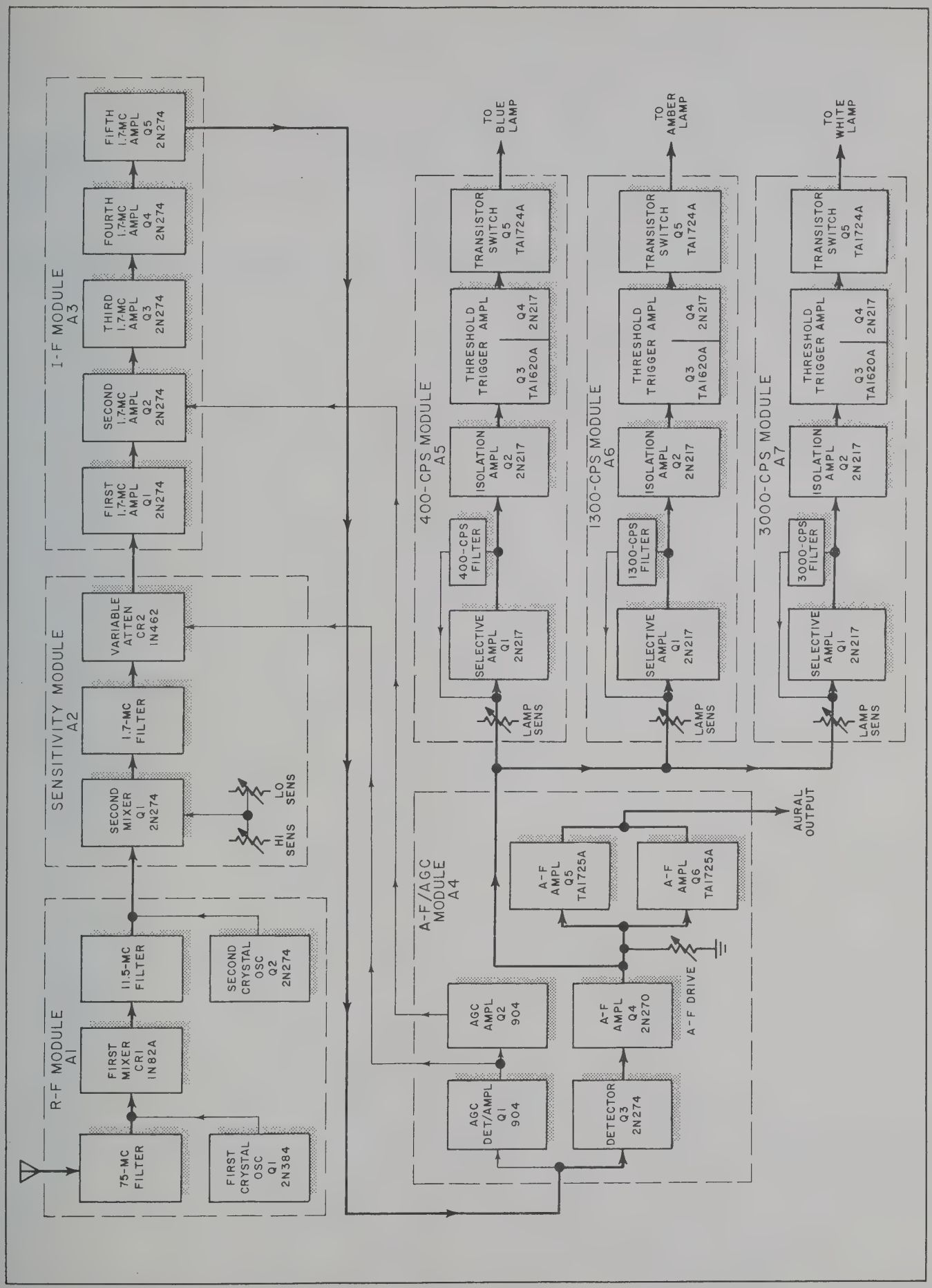


Figure 1-2. ARC Type R-33A Receiver, Block Diagram

Most of the overall selectivity of the receiver comes from a triple-tuned filter that couples the second mixer to a high-gain, broad-band, i-f amplifier. A diode variable attenuator is inserted before the i-f amplifier as part of an automatic gain control circuit. The i-f amplifier uses five transistors and has a gain of approximately 90 db.

Detection of the audio signal is accomplished by a transistor that is coupled to a two-stage amplifier. The final stage of this amplifier is push-pull and furnishes aural output into a 300-ohm impedance. A low-impedance output from the first stage of the audio amplifier is fed to three frequency-selective amplifiers. Each of the frequency-selective amplifiers uses a modified resistance-capacitance bridge, negative-feedback arrangement to separate the marker modulation frequencies of 400, 1300, and 3000 cps. In each case, an isolation amplifier couples the output of the frequency-selective amplifier to a two-transistor threshold trigger circuit. The trigger circuit biases the base of a transistor switch to control lighting of an indicator lamp.

In addition to supplying the signal detector, the i-f amplifier drives a two-stage agc detector-amplifier. This amplifier has two outputs. One output controls the bias of the diode variable attenuator; the other provides a varying bias for the second stage of the i-f amplifier.

SECTION II

INSTALLATION

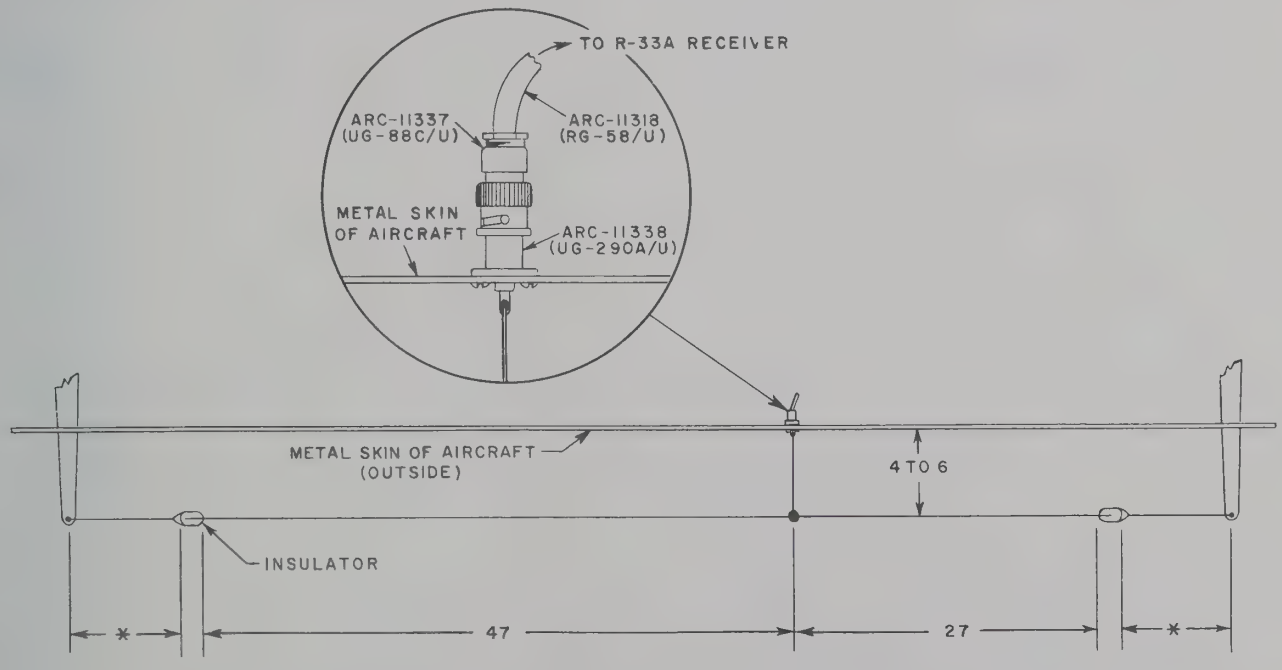
2-1. UNPACKING.

Remove all packing material from the packing case and carefully remove the equipment. Examine the packing material carefully for small parts, such as connectors, that might otherwise be overlooked. Inspect the equipment for damage incurred during shipment. Check the unit and accessories against the packing slip and the list of accessories supplied (Table 1-1).

2-2. INSTALLATION CONSIDERATIONS.

General. The ARC Type R-33A Receiver may be installed in any convenient location within the aircraft. The location, however, should be such that the receiver is accessible for maintenance and inspection. Allow sufficient clearance for maximum movement of the receiver on its shockmounts. Keep the antenna cable and other wiring as short as possible. Bench tests and adjustments should be made only by a qualified technician.

Antenna. The R-33A Receiver is designed for use with a 50-ohm antenna, which may be either a wire or a flush-mounted type. A standard 74-inch, inverted "T" wire antenna (see Figure 2-1) mounted on the belly of the aircraft may be used where practical. If a wire antenna is used, place it 4 to 6 inches away from the skin of the aircraft. Break up supporting wires longer than 10 inches with insulators. A flush-mounted antenna is operationally satisfactory but requires a rather significant cut-out in the skin of the aircraft. Other external types, with or without streamlined housings, may be used.



* LENGTH UNBROKEN BY INSULATOR SHOULD NOT EXCEED 9 INCHES.

NOTE: DIMENSIONS ARE IN INCHES.

TP1651

Figure 2-1. Outline Dimensions and Installation of 75-Megacycle Marker Beacon Antenna

External Wiring. An interconnection diagram of the wiring associated with the receiver is shown in Figure 2-2. Sufficient slack should be left to allow removal of the unit for adjustment with wires connected. Wires should be cabled and supported as required after interconnection. Assembly instructions for the antenna cable assembly are shown in Figure 2-3.

The R-33A Receiver requires either 14-volt or 28-volt dc power for operation. Connection to the source should be made through a 1-ampere circuit protective device and a switch, located as desired.

2-3. PREINSTALLATION CHECKS.

General. Before installing the receiver, remove the dust cover (secured by a single Dzus fastener in the rear) and inspect for physical damage. After this inspection, bench-test the unit to verify proper operation of the receiver. Table 2-1 lists the suggested equipment for the bench test. Equivalent items may be used. Not included in the table, but needed, are a suitable connector for connecting the coaxial cable to the signal generator, connectors for the C-83A Control Unit, and an interconnecting cable assembly.

TABLE 2-1. TEST EQUIPMENT

Qty	Item	Recommended Unit
1	R-f Signal Generator	Hewlett-Packard Model 608D
1	A-f Signal Generator	Hewlett-Packard Model 200AB
1	6-db, 50-ohm Pad	—
1	50-ohm Coaxial Cable	RG-58/U (ARC Part No. 11318)
1	BNC Connector	UG-88C/U (ARC Part No. 11337)
1	Plug	ARC Part No. 21766
1	300-ohm Load	5%, 1/2-watt resistor
1	Control Unit	ARC Type C-83A

[1]See Figure 2-2 for equivalent items.

Bench Test Procedure.

Step 1. Connect the antenna jack of the R-33A Receiver to the Hewlett-Packard Model 608D Signal Generator through a 6-db, 50-ohm pad. Connect the receiver to the d-c power source and accessories as shown in Figure 2-2. The switch in the sensitivity control lead should be in the LO (open) position.

Step 2. Using a crystal calibrator, tune the Model 608D to 75 mc. (The Model 608D has a self-contained crystal calibrator.) Adjust the Model 608D and the Hewlett-Packard Model 200AB Signal Generator for 90 per cent modulation at 400 cps.

Step 3. Starting with minimum output from the Model 608D, slowly increase the output until the blue lamp lights. Record output of the signal generator when the lamp lights.

Step 4. Repeat Step 3 at 1300-cps modulation for the amber lamp and at 3000-cps modulation for the white lamp. The minimum output for lamp operation should be approximately 2000 "hard" microvolts from the Model 608D for each modulation frequency.

Step 5. Place the sensitivity control switch in the HI position and check that the minimum output for lamp operation is approximately 200 "hard" microvolts from the Model 608D for each modulation frequency.

Note

If sensitivity requires adjustment, refer to paragraph 4-3 for the procedure.

2-4. INSTALLATION PROCEDURES.

Mounting. The R-33A is designed for installation in an ARC Series 40 Mounting. Figure 2-4 gives the outline dimensions for a single-unit installation with the receiver mounted on an ARC Type M-41B Mounting. Figure 2-5 shows the outline dimensions of the M-41B Mounting. To install the mounting, drill the aircraft mounting surface for eight #6 binding head machine screws, located as shown in Figure 2-5. To insure proper bonding of the mounting, the aircraft mounting surface must be clean, bare metal. Insert screws through the eyelets attaching the shock mounts to the lower plate, and place the M-41B in position. Secure with nuts and lockwashers.

Note

The bottom plate of the M-41B may be used as a template in locating the holes to be drilled.

Receiver. To install the R-33A Receiver on the M-41B Mounting, proceed as follows:

Step 1. Assemble the ARC-21766 Connector and the ARC-22236 Plate as shown in Figure 2-6. These items and the six fillister head machine screws required are supplied in ARC-22424 Connector Kit S2.

Step 2. Drop contacts, one at a time, into the rear of the plastic connector block and solder the proper wire to each contact as specified in Figure 2-2. Do not get solder on outside of contact. As each wire is soldered, push the contact into the block until it seats.

Note

Wires may be soldered to contacts before contacts are inserted in plug block. To remove contacts from plug block, use ARC-22001 and ARC-22002 Contact Removing Tools.

Step 3. Remove the top cover of the coupling box (part of M-41B Mounting) and release the cable clamp.

Step 4. Attach the connector and plate assembly to the inside front face of the coupling box as indicated in Figure 2-5. Beveled corners of the connector must be down. Replace the cable clamp so as to secure the wires and to eliminate strain on the contacts. Replace the top cover of the coupling box.

Step 5. Place the coupling box on the rear of the M-41B Mounting and secure with the snapslides at the rear of the tray.

Step 6. Install the receiver by sliding the unit in place. Secure the receiver by engaging it with the clamp at the front of the tray and tightening the thumbscrew.

Step 7. Connect the antenna cable assembly to the antenna connector on the front panel of the receiver.

Controls and Indicators. The external volume control, HI-LO sensitivity switch, and indicator lights may be contained in a single unit for console mounting, or they may be separate items for custom installation.

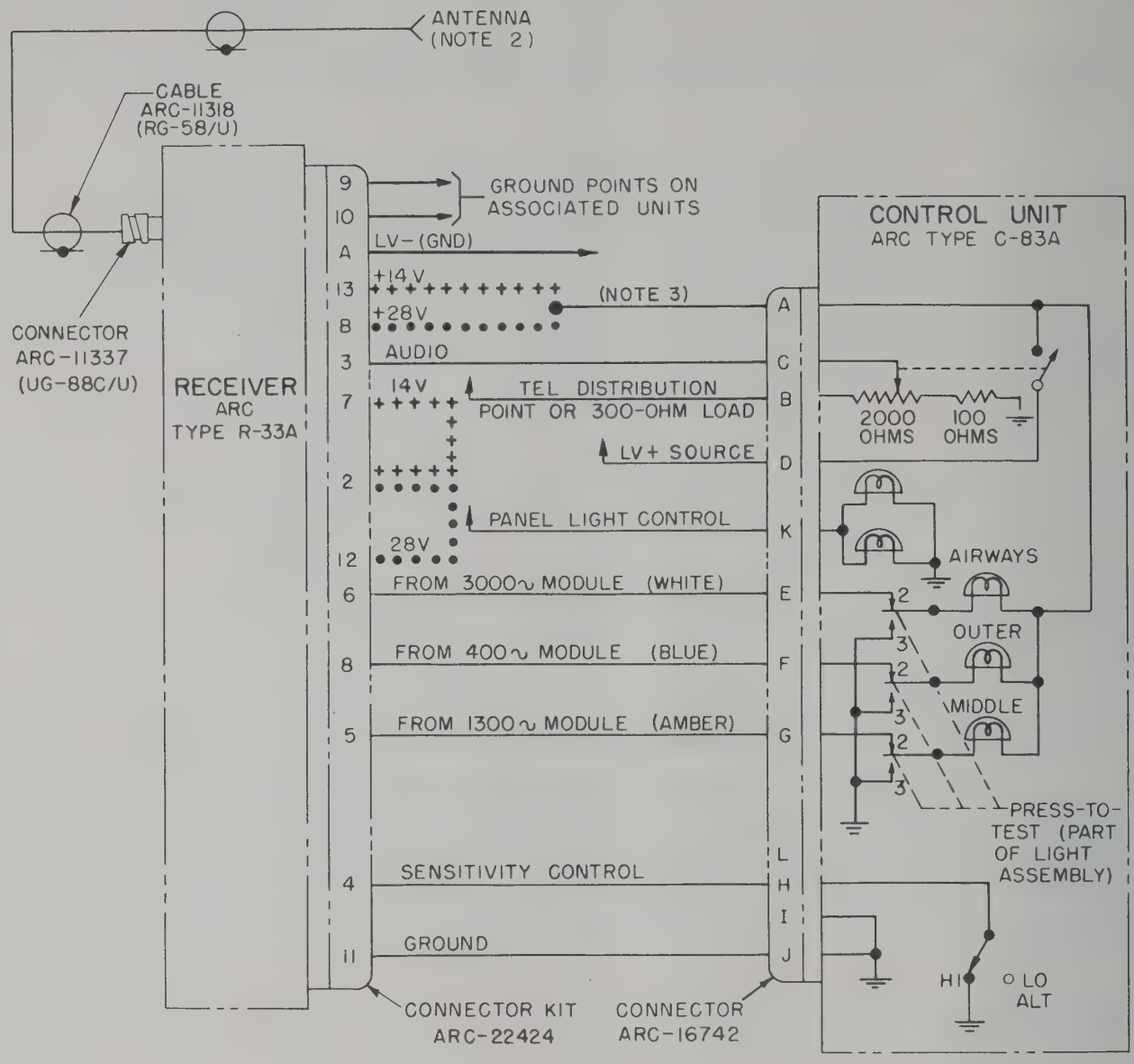
The ARC Type C-83A Control Unit is designed for use in aircraft equipped with console mounting facilities. The C-83A is edge-lighted and contains a combination volume control and on-off switch, three indicator lights, and a high-low sensitivity control switch. Refer to Figure 2-7 for outline dimensions of the C-83A.

For custom installation, three indicator lights, a sensitivity control switch, and (if desired) an audio level control are mounted separately on the instrument panel. A suggested arrangement for lights and sensitivity switch is shown in Figure 2-8. In this arrangement, four holes (size determined by lights and switch) are drilled in the instrument panel and the panel is stenciled as indicated. A single-pole, single-throw switch is required for changing the sensitivity level of the receiver from high to low. An additional single-pole, single-throw switch must be installed, either on the instrument panel or in a convenient location, to control the application of power to the receiver. This switch may be combined with the audio-level control if an external audio-level control is provided.

2-5. OPERATIONAL CHECK.

An in-flight operational check should be made after installation and connection of the receiver. With the sensitivity switch in the LO position, fly over a standard "Z" marker at 1000 feet above ground and at 120 mph ground speed. The white lamp should operate for from 12 to 15 seconds. At normal operating altitude and speed, observe the lamp-on time with the sensitivity switch in the HI position.

Set the front panel volume control of the receiver for the maximum audio level desired. If adjustment of the sensitivity level is required, refer to paragraph 3-3 for the procedure to be followed.



NOTES:

1. WIRES ARE NO. 20 AWG STRANDED COPPER, FIBROUS-GLASS INSULATED, EXCEPT ANTENNA LEAD.
2. ANTENNA TO BE 50-OHM, 75-MC ANTENNA.
3. FOR 14-VOLT UNIT, WIRES MARKED + + + + ARE CONNECTED AND WIRES MARKED . . . . ARE OMITTED.
4. FOR 28-VOLT UNIT, WIRES MARKED . . . . ARE CONNECTED AND WIRES MARKED + + + + ARE OMITTED.

Figure 2-2. ARC Type R-33A Receiver, Interconnection Diagram

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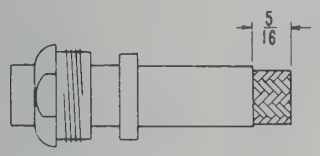
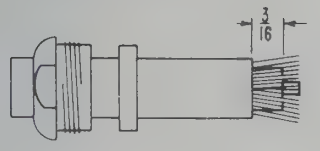
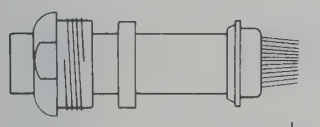
ASSEMBLY INSTRUCTIONS FOR IMPROVED SERIES BNC CONNECTORS



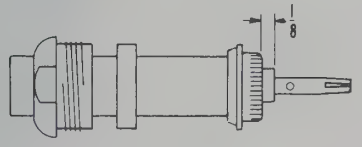
PLACE NUT AND GASKET OVER CABLE AND TRIM JACKET TO DIMENSION SHOWN.



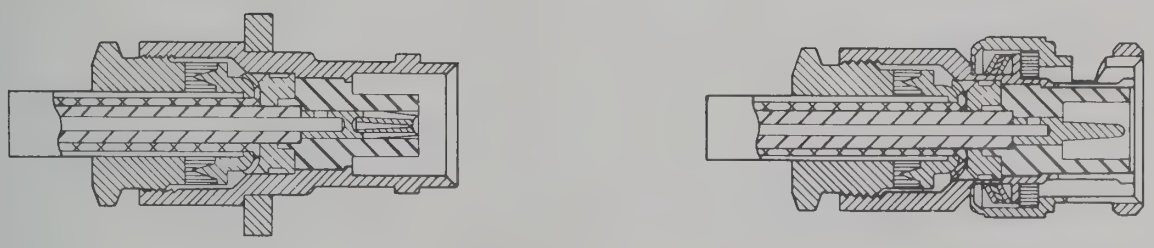
COMB OUT BRAID AND CUT CABLE DIELECTRIC TO DIMENSION SHOWN BEING CAREFUL NOT TO NICK THE CENTER CONDUCTOR. TIN CENTER CONDUCTOR.



PULL BRAID WIRES FORWARD AND TAPER TOWARD CENTER CONDUCTOR. PLACE CLAMP OVER BRAID AND PUSH BACK AGAINST CABLE JACKET.



FOLD BACK BRAID WIRES AS SHOWN, TRIM TO PROPER LENGTH AND FORM OVER CLAMP AS SHOWN. FOR RG-62/U AND RG-71/U CABLE ADD BUSHING. SOLDER CONTACT TO CENTER CONDUCTOR.



INSERT CABLE AND PARTS INTO CONNECTOR BODY. MAKE SURE SHARP EDGE OF CLAMP SEATS PROPERLY IN GASKET. TIGHTEN NUT.

Figure 2-3. Fabrication of Antenna Cable Assembly

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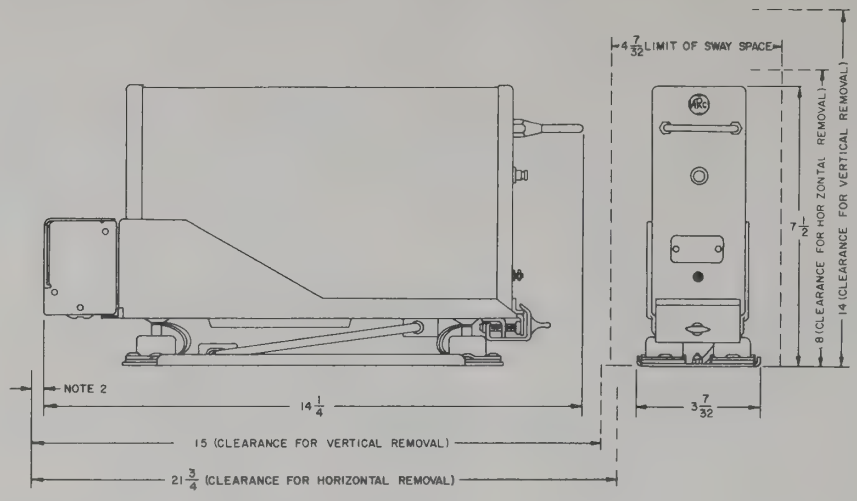
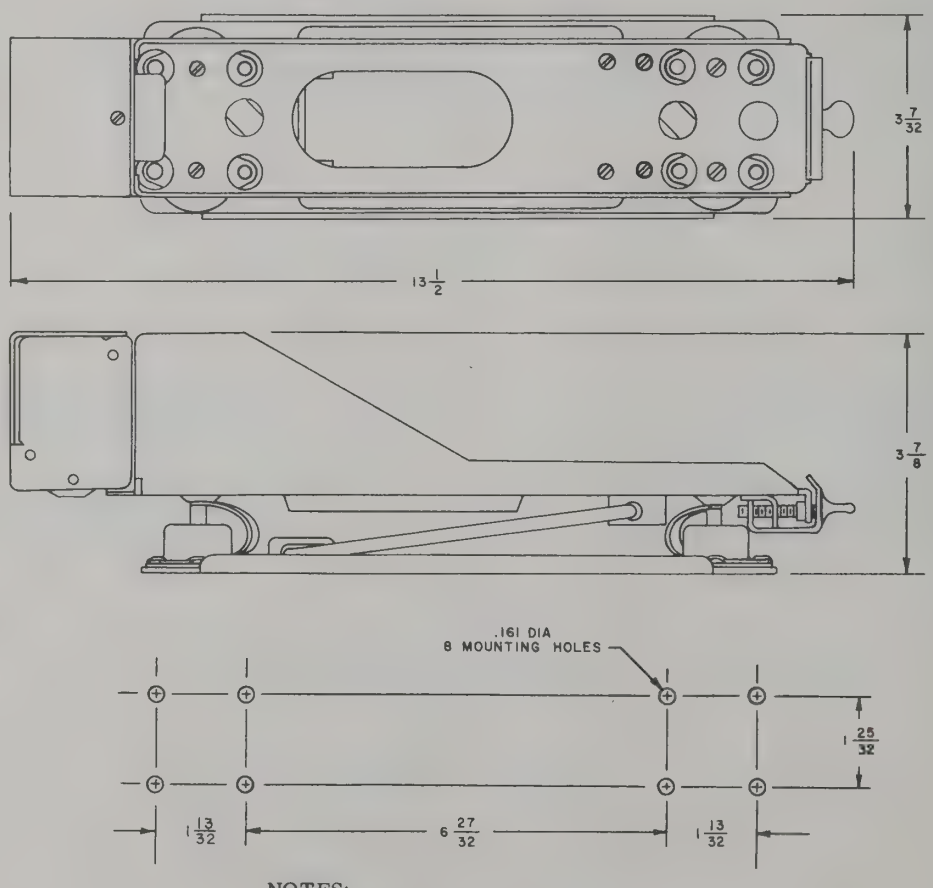


NOTES:
1. DIMENSIONS ARE IN INCHES.
2. ALLOW 2 INCHES AT REAR FOR CABLE BEND.
3. HEAT DISSIPATION (NO SIGNAL): 14-VOLT MODEL — 4.5 WATTS
   28-VOLT MODEL — 10 WATTS
4. WEIGHT: 5 LB INCLUDING MOUNTING.

Figure 2-4. ARC Type R-33A Receiver with ARC Type M-41B Mounting, Outline Dimensions TP1655



NOTES:
1. DIMENSIONS ARE IN INCHES.
2. WEIGHT: 1.4 LB.

Figure 2-5. ARC Type M-41B Mounting, Outline Dimensions TP1657

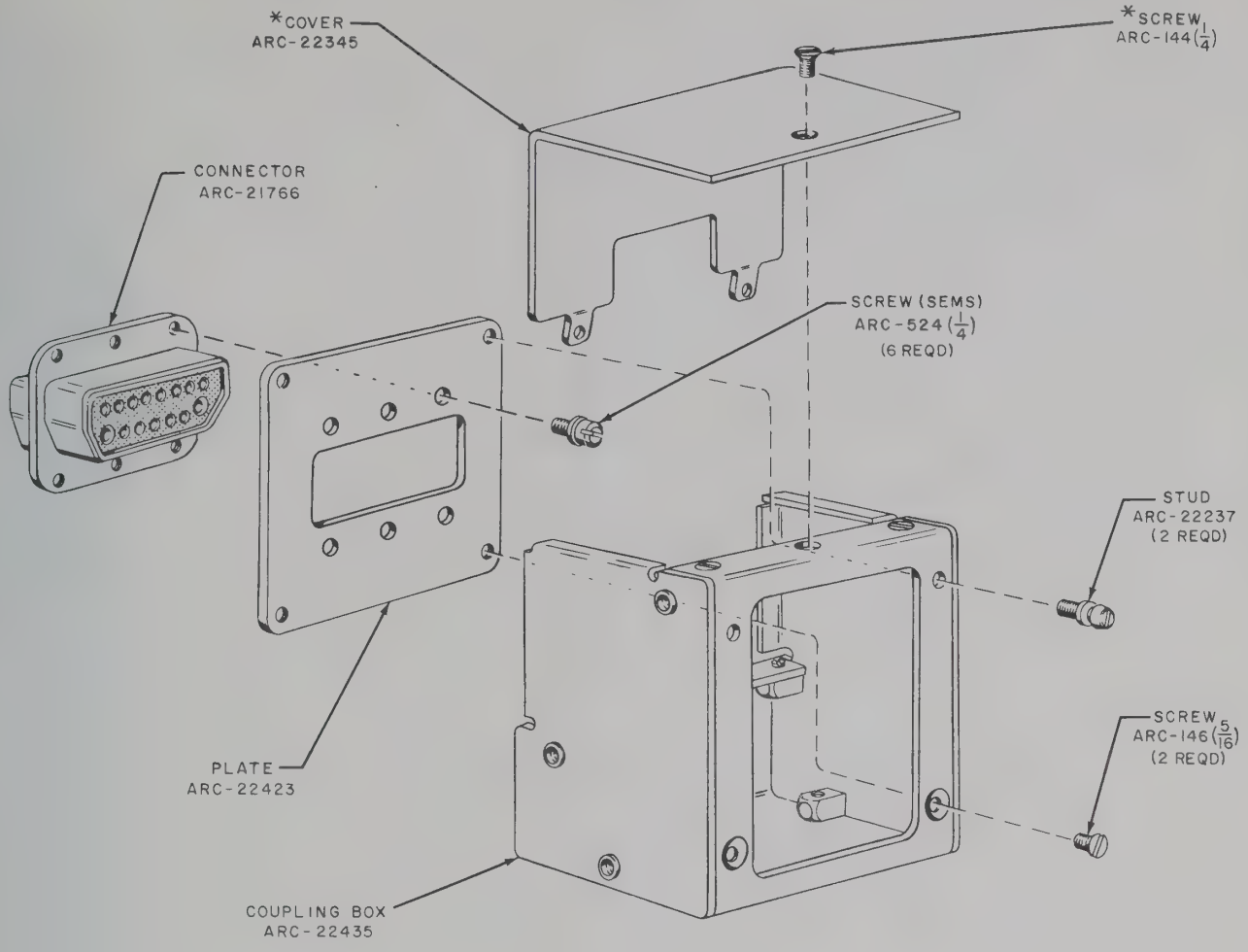


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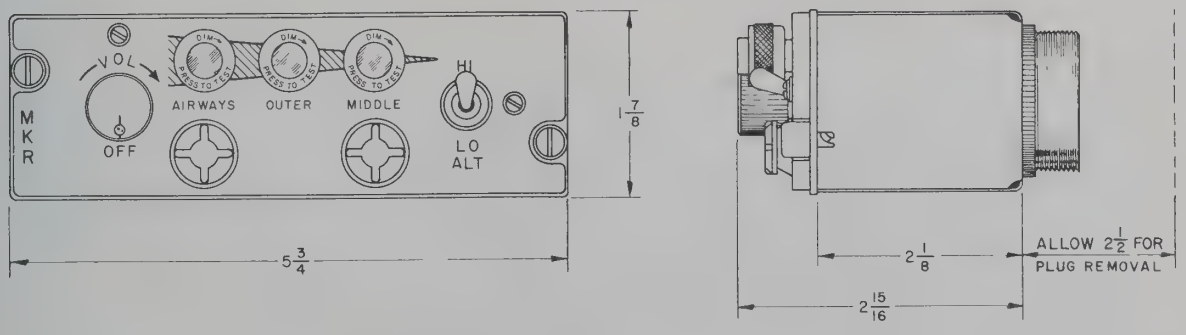
Figure 2-6. Assembly of Connector, Plate, and Coupling Box



NOTE: DIMENSIONS ARE IN INCHES.

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Figure 2-7. ARC Type C-83A Control Unit, Outline Dimensions

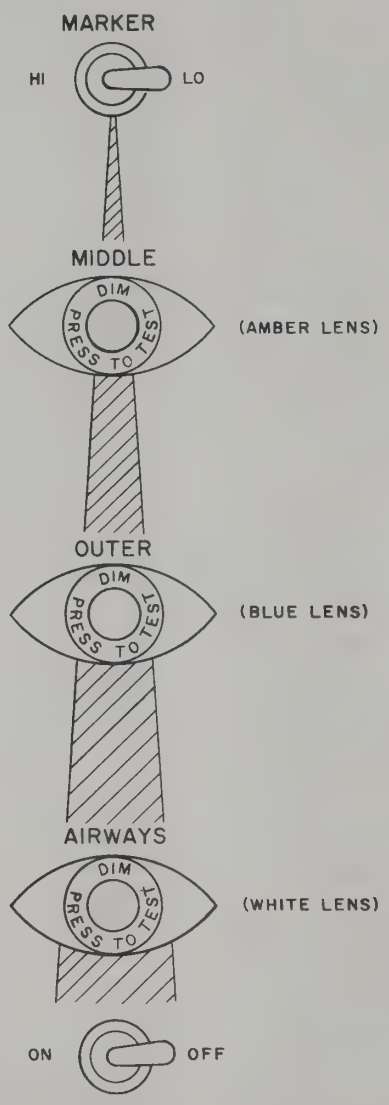


Figure 2-8. Suggested Indicator Light Arrangement

TP1653

SECTION III

OPERATION

3-1. OPERATING LIMITATIONS AND PRECAUTIONS.

The ARC Type R-33A Receiver is a fixed-tuned 75-megacycle receiver that provides visual and aural indications of airway and ILS marker beacon signals. There are no operating limitations or precautions to be observed.

3-2. OPERATING CONTROLS.

The R-33A contains no operating controls. The required operating controls are located externally and consist of a high-low sensitivity-control switch, an audio-level control (if desired), and an on-off switch. The on-off switch may be combined with the audio level control. These controls and the three indicator lights required may be mounted separately on the instrument panel (see Figure 2-8) or they may be contained in a control unit such as the ARC Type C-83A Control Unit (see Figure 3-1).

3-3. OPERATING PROCEDURE.

Note

The following procedure assumes the use of the ARC Type C-83A Control Unit but is applicable to similar control installations.

Step 1. Turn the VOL-OFF control clockwise to apply power to the receiver.

Step 2. Depress each lamp cap to check that the lamps are operative.

Step 3. Place the sensitivity switch in the HI position for high-altitude airway flying and in the LO position for ILS approaches.

Step 4. Adjust the audio level by rotating the VOL-OFF control to the setting desired.

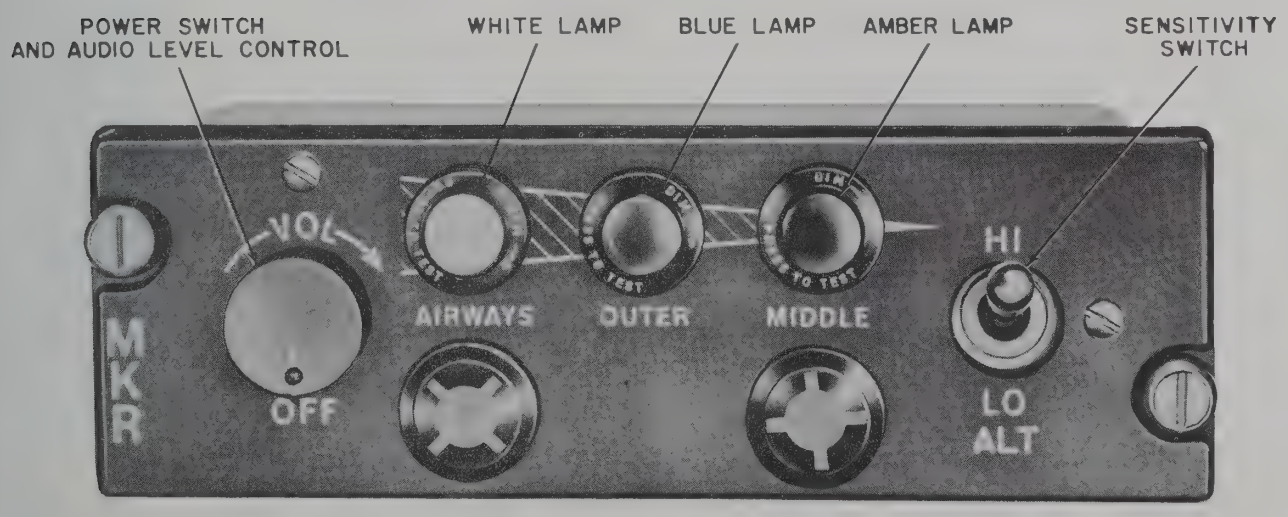


Figure 3-1. ARC Type C-83A Control Unit, Controls and Indicators

TP1330

SECTION IV

MAINTENANCE

4-1. GENERAL.

The locations of internal adjustment controls are shown in Figure 4-1. A schematic diagram of the receiver is shown in Figure 5-1. Figures 5-2 through 5-9 are wiring diagrams for the receiver and show the location of parts. In case of faulty operation, remove the dust cover of the receiver and inspect for loose connections and for evidence of overheating. If visual inspection does not disclose the trouble, make continuity and resistance checks (refer to paragraph 4-3).

4-2. REMOVAL AND REPLACEMENT PROCEDURES.

To remove the dust cover, release the Dzus fastener at the rear and slide the cover off the receiver. To remove a module, remove the chassis screw at each end of the module. Insert a screwdriver in the chassis slot at each end of the module and apply force upward until the jacks on the edge of the module printed-circuit board disconnect from the pins on the chassis printed-circuit board. Remove the screwdrivers and lift the module out.

Note

Before lifting the r-f module out, disconnect coaxial cable W1 from the module.

To replace a module, slide it in place until the jacks on the module fully engage the pins on the chassis printed-circuit board. Secure the module to the chassis by replacing the chassis screw at each end of the module

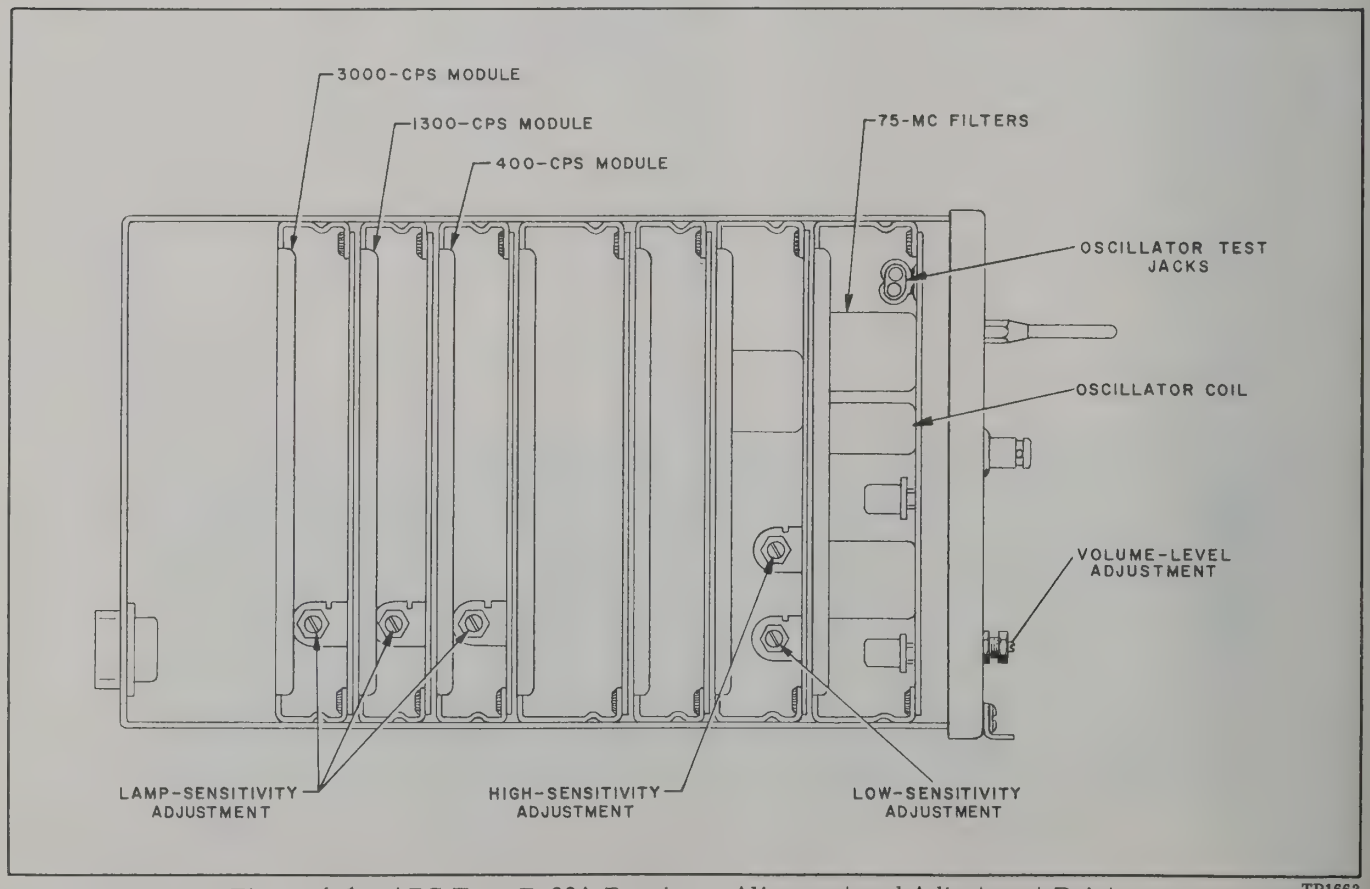


Figure 4-1. ARC Type R-33A Receiver, Alignment and Adjustment Points

TP1663

4-3. CONTINUITY AND RESISTANCE CHECKS.

Take care when making continuity and resistance checks of the R-33A Receiver to avoid damage to transistors, diodes, and low-voltage, tantalum, electrolytic capacitors. In general, these parts should be disconnected at one end before making continuity or resistance tests of the circuits. If a transistor, diode, or low-voltage, tantalum, electrolytic capacitor is suspected of being defective, substitute a new one and recheck the performance of the receiver.

Note

When soldering or unsoldering any lead to a diode or a transistor, grip the lead with pliers between the solder joint and the diode or transistor. The pliers form a heat sink that keeps excessive heat from reaching the diode or transistor.

4-4. ALIGNMENT AND ADJUSTMENT.

Equipment Required. The items listed in Table 2-1 are required for alignment and adjustment of the R-33A Receiver. Equivalent items may be used. In addition, a Ballantine Model 300 Voltmeter and a Weston Model 301 Milliammeter (0 to 5 ma), or their equivalents, are required.

Oscillator Alignment. Remove the jumper from the oscillator test jacks in the receiver (see Figure 4-1) and connect the Weston Model 301 in place of the jumper. Apply low-voltage d-c power to the receiver (see Figure 2-2) and allow the receiver to warm up at least 15 minutes. Align the 63.5-mc oscillator by adjusting the slug of the oscillator coil until maximum deflection occurs on the milliammeter, and note the reading. Back the slug out (counterclockwise rotation) until the meter reads approximately 70.7 per cent of the peak indication. Replace the jumper.

75-mc Filter Alignment. The procedure for alignment of the 75-mc filters (see Figure 4-1) is as follows:

Step 1. Connect low-voltage d-c power to the receiver (see Figure 2-2). Connect an indicator lamp between pin 5 of the receiver rear-chassis connector and the positive side of the low-voltage d-c source. Connect the 300-ohm load resistor to pins 3 and 9. Turn the front-panel potentiometer to its maximum clockwise position.

Step 2. Allow the receiver to warm up for 15 minutes.

Step 3. Connect the output of the Hewlett-Packard Model 608D Signal Generator through the 6-db, 50-ohm pad to the antenna jack of the receiver. Connect the vacuum tube voltmeter across the 300-ohm load resistor.

Step 4. Using its crystal calibrator, tune the Model 608D to 75 mc. Adjust the Model 608D and the Hewlett-Packard Model 200AB Signal Generator for 95 per cent modulation at 1300 cps.

Step 5. Keeping the output signal level of the Model 608D below that which causes the indicator lamp to light, adjust each of the three slugs of A1Z1 for maximum indication on the vtvm. Adjust the slugs in the order 1, 2, 3, 1, 2.

Step 6. Connect pin 4 of the R-33A rear-chassis connector to chassis ground. Set the Model 608D for an output of 2000 μv and adjust the front-panel potentiometer of the R-33A for a voltage of 8.66 volts across the load resistor, as indicated by the vtvm.

Sensitivity Adjustment. The procedure for adjusting the sensitivity of the receiver is as follows:

Step 1. Make external connections to the rear connector of the receiver as shown in Figure 2-2, but use the 300-ohm load resistor for the audio output. Turn the front-panel potentiometer and the external volume control to their maximum clockwise positions. Place the sensitivity level switch in the LO (open) position.

Step 2. Apply low-voltage d-c power to the receiver and allow it to warm up for 15 minutes.

Step 3. Connect the output of the Model 608D through the 6-db, 50-ohm pad to the antenna jack of the receiver. Connect the vacuum tube voltmeter across the 300-ohm load resistor. Connect the Model 200AB for external modulation of the Model 608D.

Step 4. Using its crystal calibrator, tune the Model 608D to 75 mc. Adjust the Model 200AB and Model 608D for 95 per cent modulation at 1300 cps.

Step 5. Set the lamp-sensitivity control (see Figure 4-1) of the 1300-cps module fully clockwise (maximum sensitivity position). Starting with minimum output, slowly increase the output of the Model 608D until the amber lamp lights. Record the output of the Model 608D.

Step 6. Repeat Step 5 at 3000-cps modulation for the white lamp, and at 400-cps modulation for the blue lamp.

Step 7. Adjust the lamp-sensitivity controls of the two more-sensitive modules so that the same output from the Model 608D is required to light each of the three lamps.

Step 8. Adjust the Model 200AB and Model 608D for 95 per cent modulation at 1300 cps. Adjust the low-sensitivity control for lamp threshold at 2000 microvolts output from the Model 608D.

Step 9. Increase the Model 608D output to 20,000 microvolts. Turn the front-panel potentiometer of the R-33A counterclockwise until the voltage across the 300-ohm load resistor is 8.66 volts, as indicated by the vtvm.

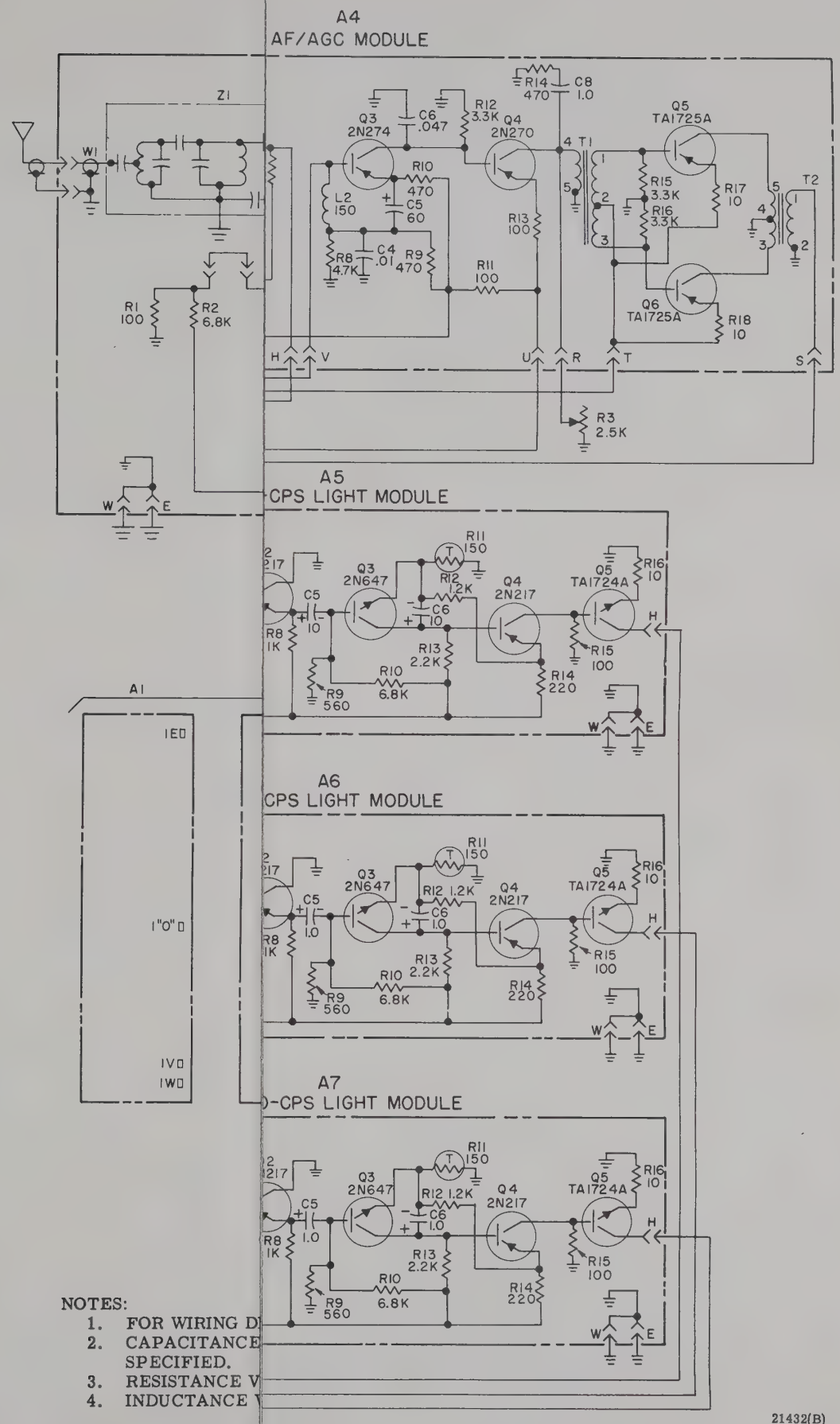
Step 10. Check that lamp threshold occurs at 2000-microvolt output from the Model 608D for each of the three lamps. Readjust the lamp-sensitivity controls and the low-sensitivity control, if necessary.

Step 11. Adjust the Model 200 AB and Model 608D for 95 per cent modulation at 3000 cps. Place the sensitivity level switch in the HI (closed) position. Adjust the high-sensitivity control until the lamp threshold is 200 microvolts from the Model 608D. Record the voltage across the 300-ohm load resistor for a Model 608D output of 200 microvolts. Increase the Model 608D output and record the maximum voltage developed across the load resistor. If the maximum voltage exceeds the voltage corresponding to the 200-microvolt signal by more than 9 db, decrease the lamp-sensitivity control settings and increase the low-sensitivity and high-sensitivity control settings as required.

Step 12. Adjust the Model 200AB and Model 608D for 95 per cent modulation at 1300 cps. With the R-33A sensitivity level switch in the HI (closed) position, set the Model 608D for an output of 2000 microvolts. Adjust the front-panel potentiometer of the R-33A for a voltage of 8.66 volts across the load resistor, as indicated by the vtvm.

SECTION V

DIAGRAMS

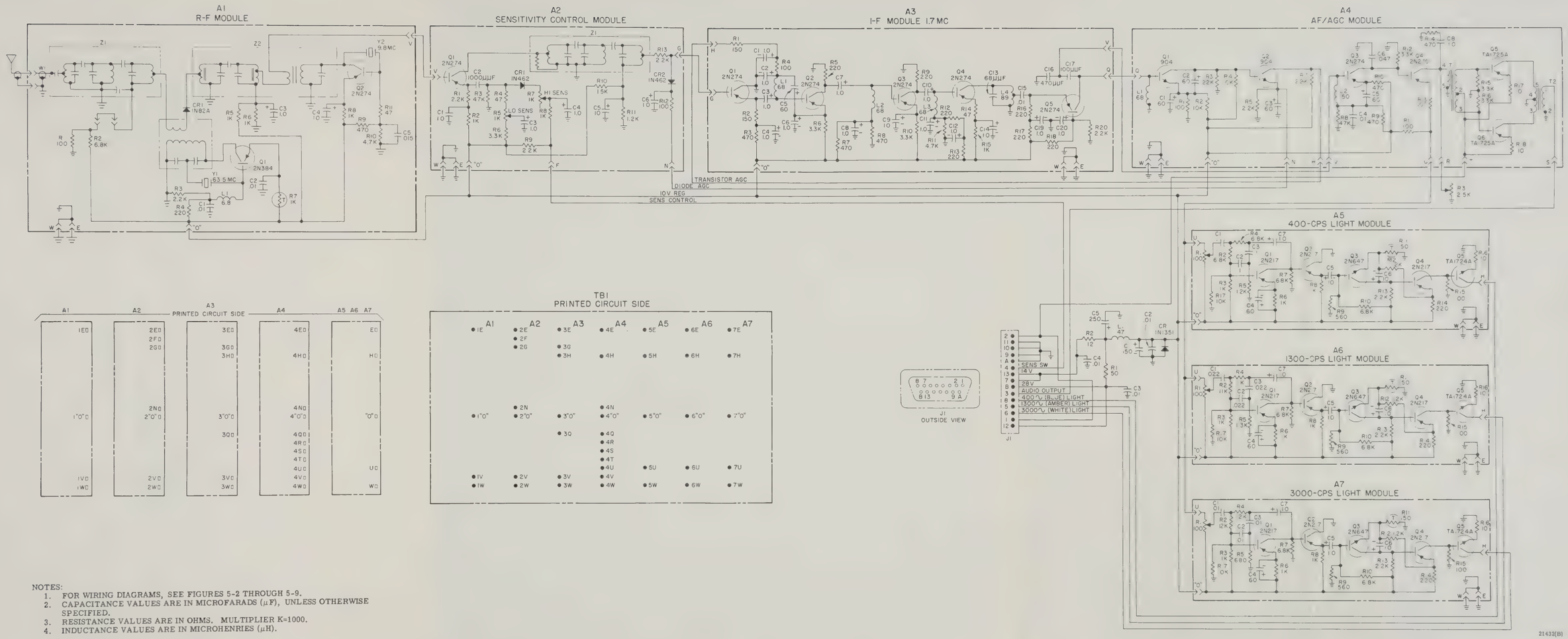


NOTES:

1. FOR WIRING D
2. CAPACITANCE
   SPECIFIED.
3. RESISTANCE V
4. INDUCTANCE V

21432(B)

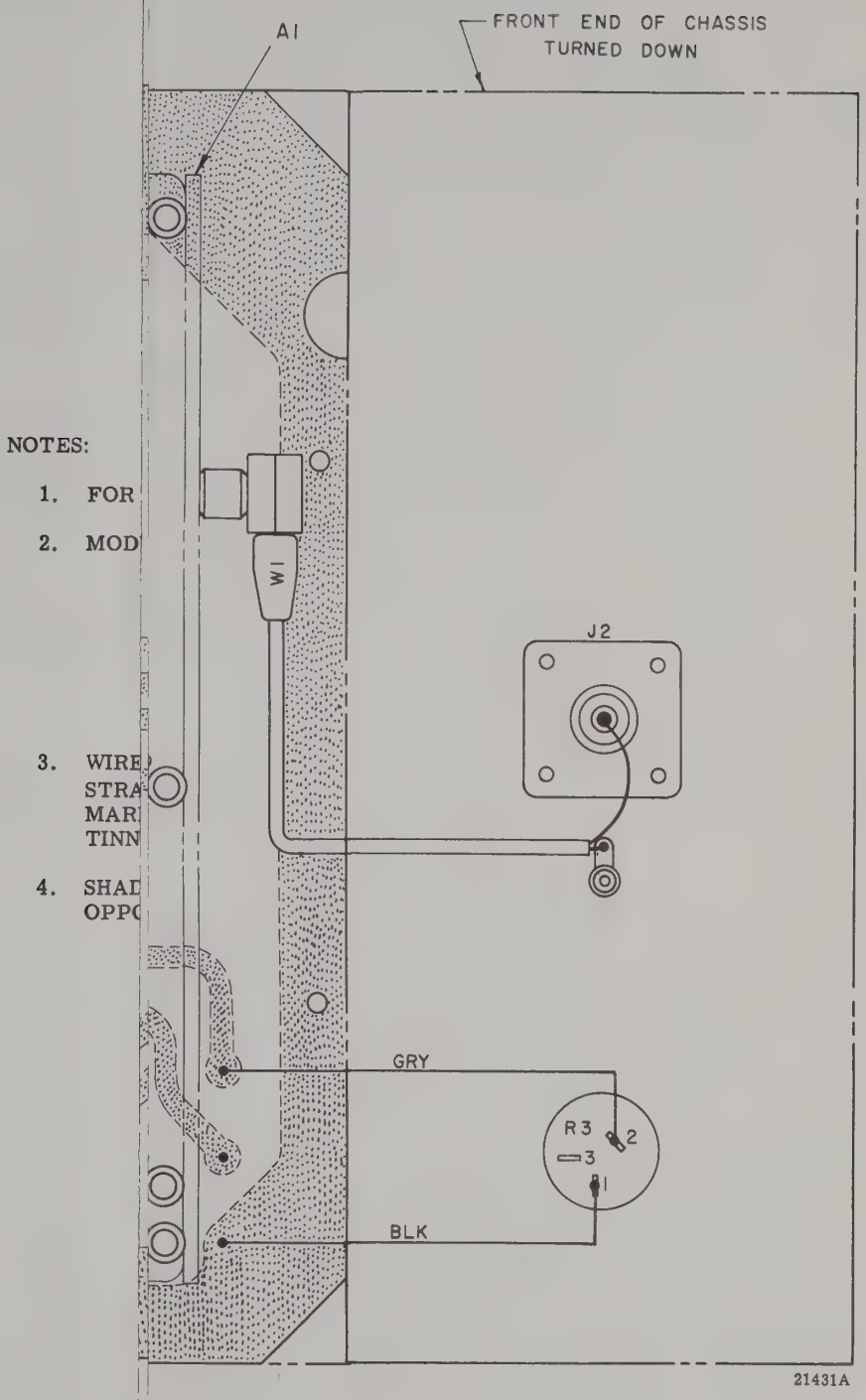
Figure 5-1. ARC Type R-33A Receiver, Schematic Diagram



NOTES:
1. FOR WIRING DIAGRAMS, SEE FIGURES 5-2 THROUGH 5-9.
2. CAPACITANCE VALUES ARE IN MICROFARADS (μF), UNLESS OTHERWISE SPECIFIED.
3. RESISTANCE VALUES ARE IN OHMS. MULTIPLIER K=1000.
4. INDUCTANCE VALUES ARE IN MICROHENRIES (μH).

21432(B)

Figure 5-1. ARC Type R-33A Receiver, Schematic Diagram



NOTES:

1. FOR
2. MOD
3. WIRE
   STRA
   MAR
   TINN
4. SHAD
   OPPC

Figure 5-2. ARC Type R-33A Receiver, Chassis Wiring Diagram

NOTES:

1. FOR SCHEMATIC DIAGRAM, SEE FIGURE 5-1.
2. MODULE WIRING DIAGRAMS ARE AS FOLLOWS:
   A1, FIGURE 5-3
   A2, FIGURE 5-4
   A3, FIGURE 5-5
   A4, FIGURE 5-6
   A5, FIGURE 5-7
   A6, FIGURE 5-8
   A7, FIGURE 5-9
3. WIRES MARKED WITH COLOR NOTE ARE NO. 24 AWG STRANDED COPPER, TEFLON INSULATED. UNMARKED WIRES ARE NO. 24 AWG BARE, SOLID, TINNED COPPER.
4. SHADED AREAS DENOTE UNETCHED COPPER ON OPPOSITE SIDE OF PANEL.

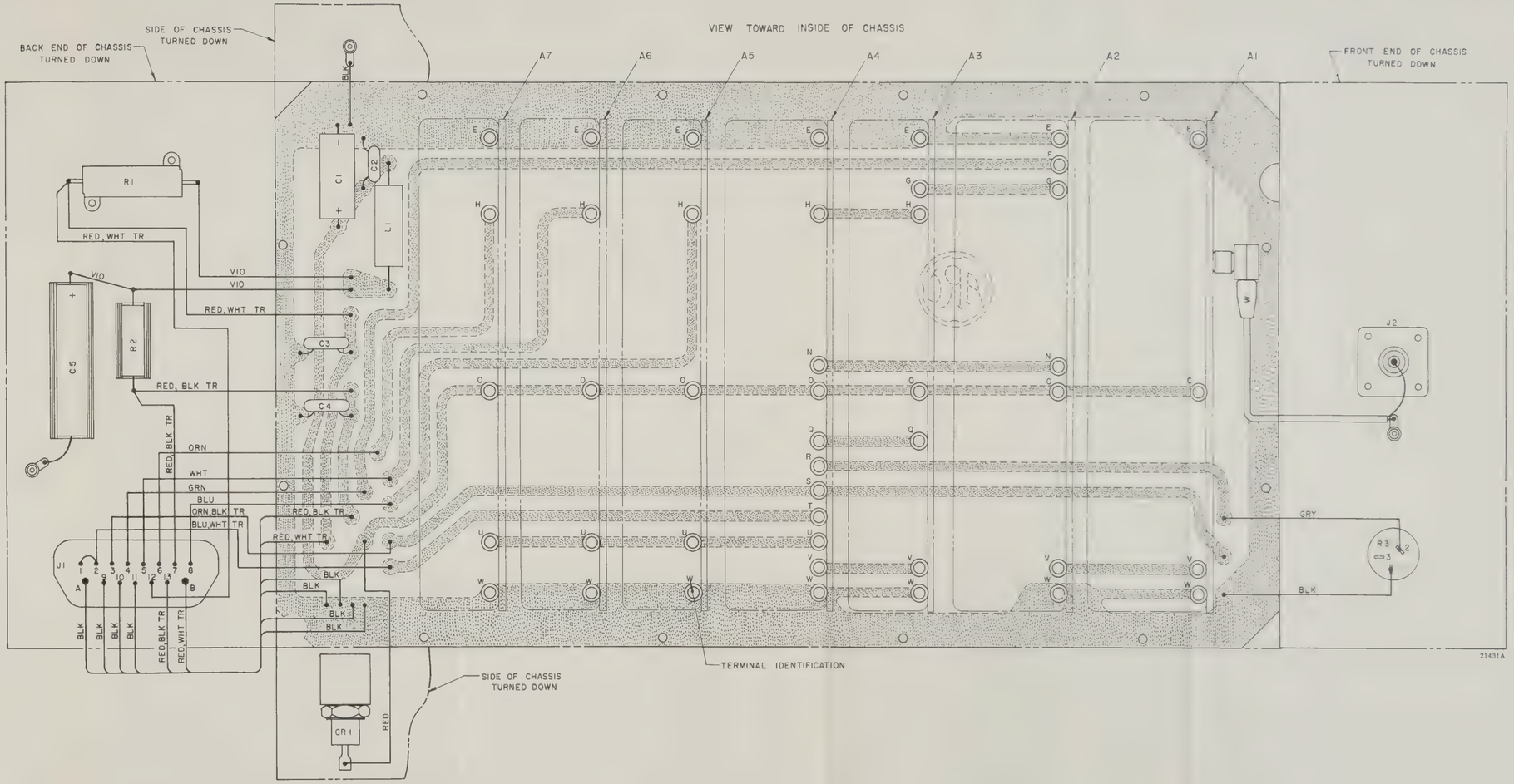
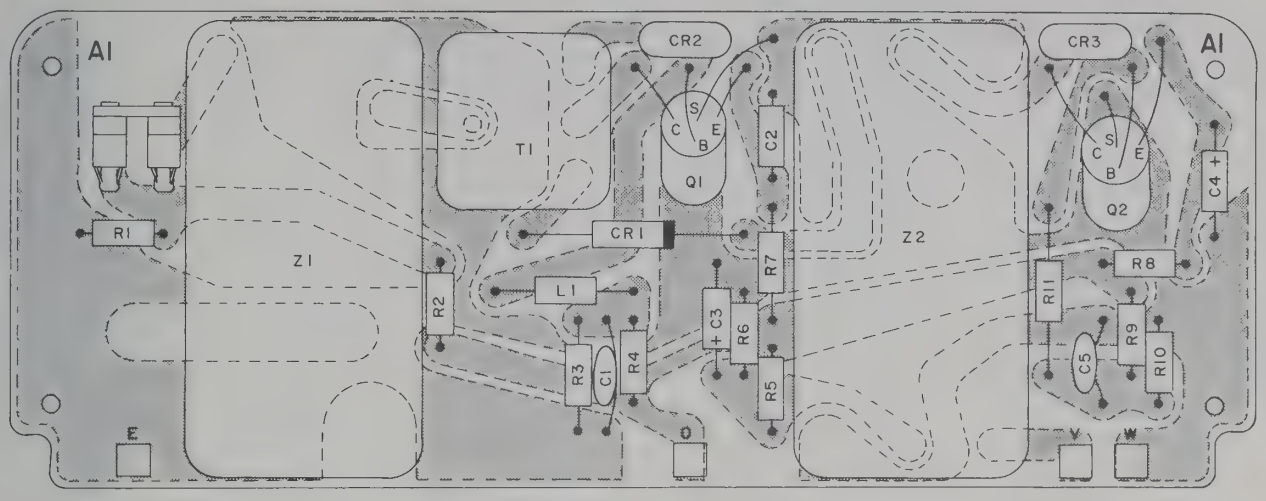


Figure 5-2. ARC Type R-33A Receiver, Chassis Wiring Diagram

VIEW FROM COMPONENT SIDE OF BOARD

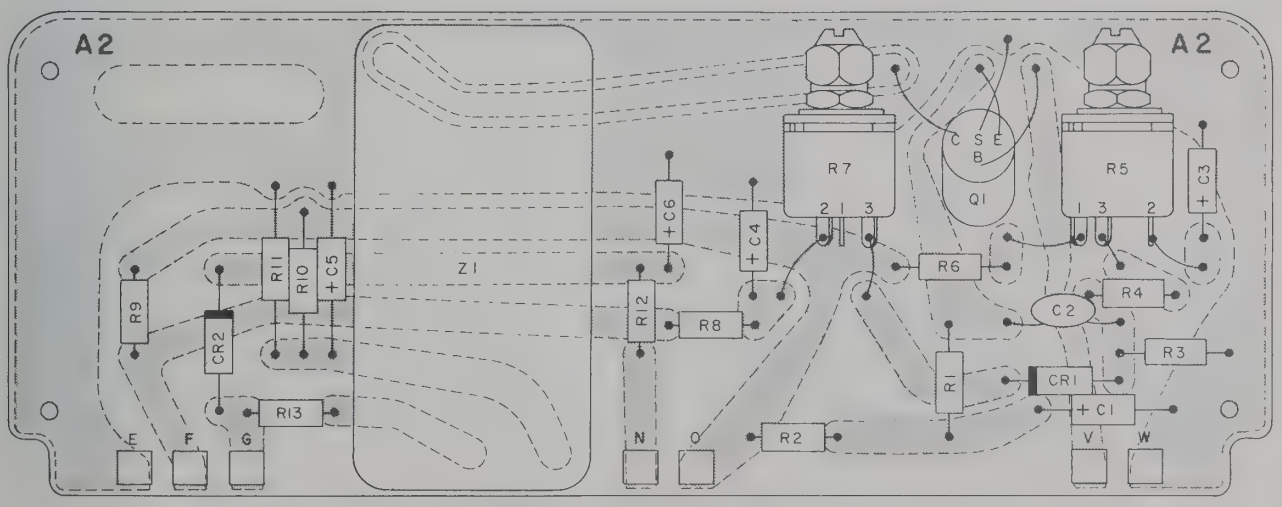


NOTES:
1. FOR CHASSIS WIRING DIAGRAM, SEE FIGURE 5-2.
2. FOR SCHEMATIC DIAGRAM, SEE FIGURE 5-1.
3. SHADED AREAS DENOTE UNETCHED COPPER ON OPPOSITE SIDE OF PANEL.

Figure 5-3. ARC Type R-33A Receiver, R-f Module Wiring Diagram

22497A

VIEW FROM COMPONENT SIDE OF BOARD

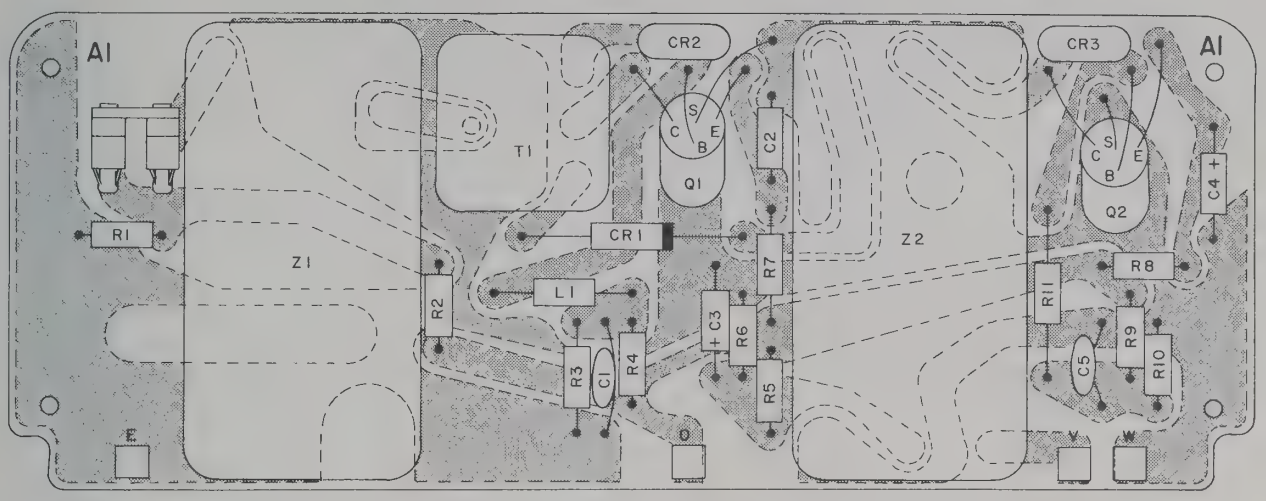


NOTES:
1. FOR CHASSIS WIRING DIAGRAM, SEE FIGURE 5-2.
2. FOR SCHEMATIC DIAGRAM, SEE FIGURE 5-1.
3. UNMARKED WIRES ARE NO. 24 AWG BARE, SOLID, TINNED COPPER.
4. SHADED AREAS DENOTE UNETCHED COPPER ON OPPOSITE SIDE OF PANEL.

Figure 5-4. ARC Type R-33A Receiver, Sensitivity Control Module Wiring Diagram

22496A

VIEW FROM COMPONENT SIDE OF BOARD

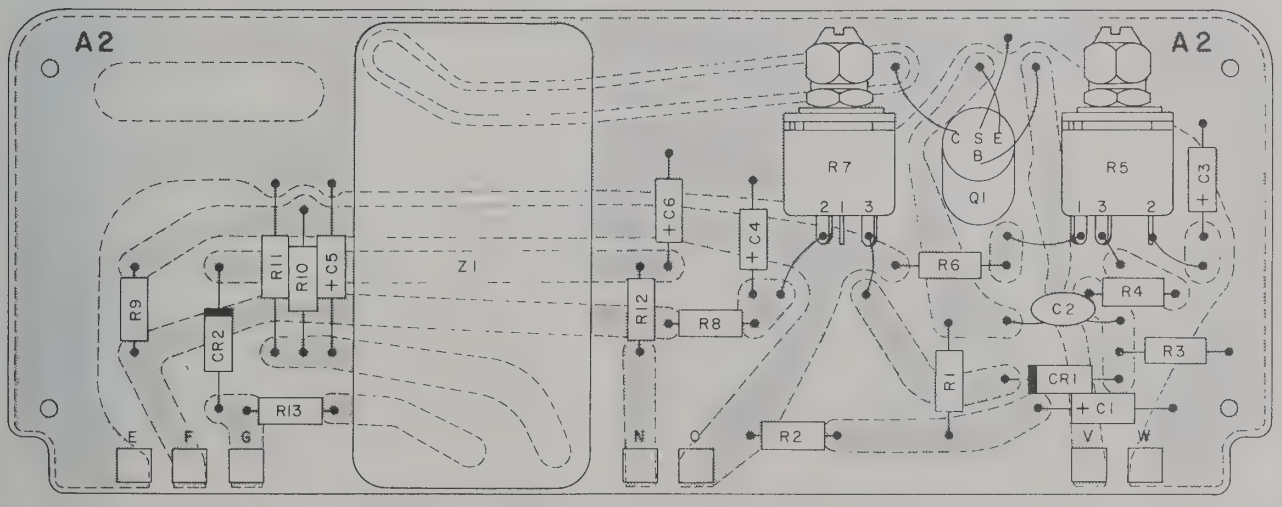


NOTES:
1. FOR CHASSIS WIRING DIAGRAM, SEE FIGURE 5-2.
2. FOR SCHEMATIC DIAGRAM, SEE FIGURE 5-1.
3. SHADED AREAS DENOTE UNETCHED COPPER ON OPPOSITE SIDE OF PANEL.

Figure 5-3. ARC Type R-33A Receiver, R-f Module Wiring Diagram

22497A

VIEW FROM COMPONENT SIDE OF BOARD

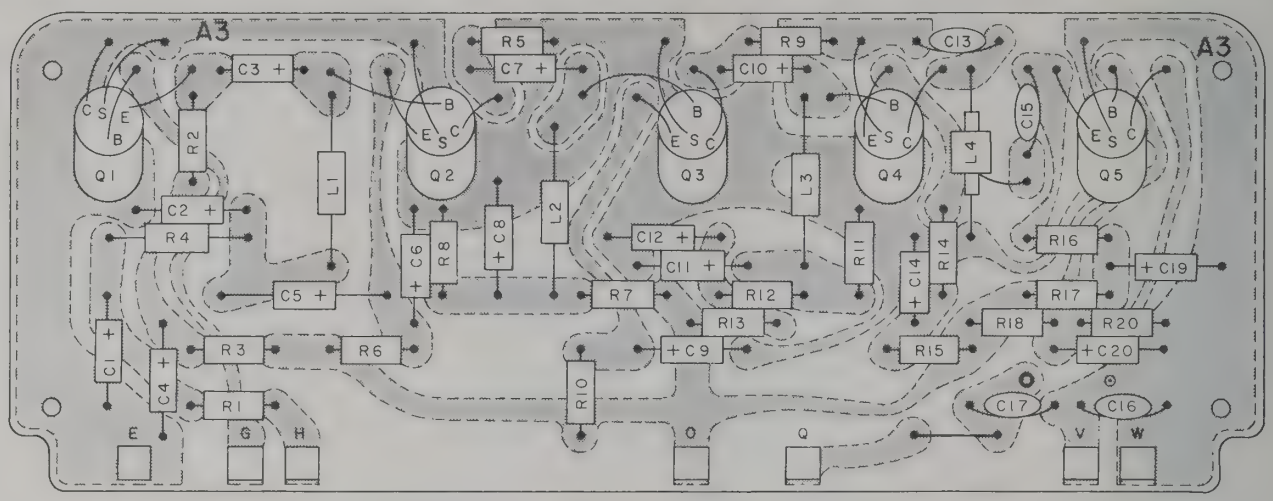


NOTES:
1. FOR CHASSIS WIRING DIAGRAM, SEE FIGURE 5-2.
2. FOR SCHEMATIC DIAGRAM, SEE FIGURE 5-1.
3. UNMARKED WIRES ARE NO. 24 AWG BARE, SOLID, TINNED COPPER.
4. SHADED AREAS DENOTE UNETCHED COPPER ON OPPOSITE SIDE OF PANEL.

Figure 5-4. ARC Type R-33A Receiver, Sensitivity Control Module Wiring Diagram

22496A

VIEW FROM COMPONENT SIDE OF BOARD

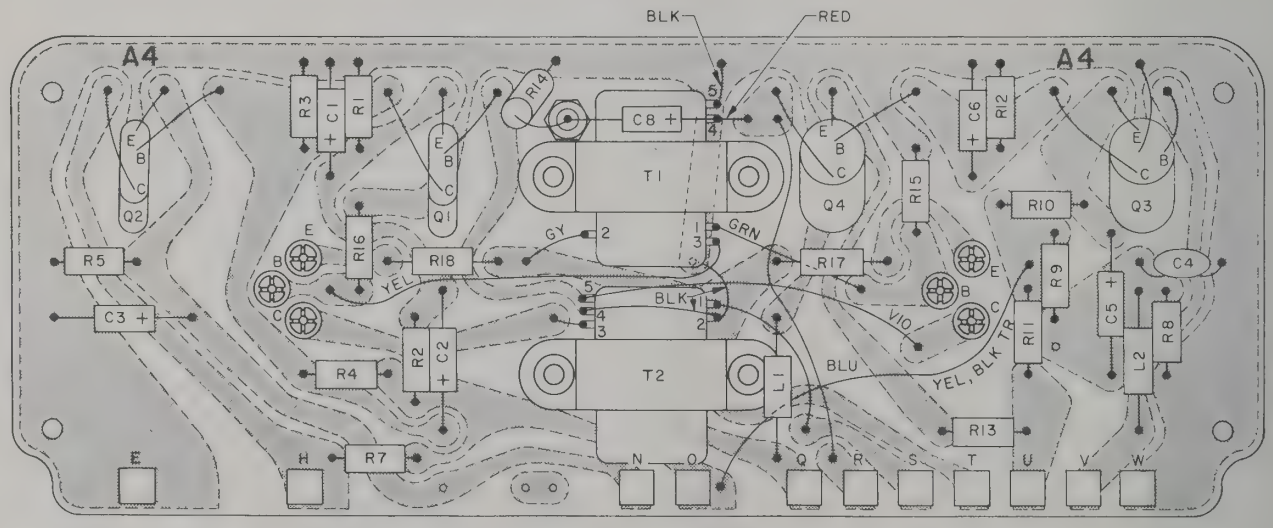


NOTES:
1. FOR CHASSIS WIRING DIAGRAM, SEE FIGURE 5-2.
2. FOR SCHEMATIC DIAGRAM, SEE FIGURE 5-1.
3. SHADED AREAS DENOTE UNETCHED COPPER ON OPPOSITE SIDE OF PANEL.

Figure 5-5. ARC Type R-33A Receiver, I-f Module Wiring Diagram

22503A

VIEW FROM COMPONENT SIDE OF BOARD

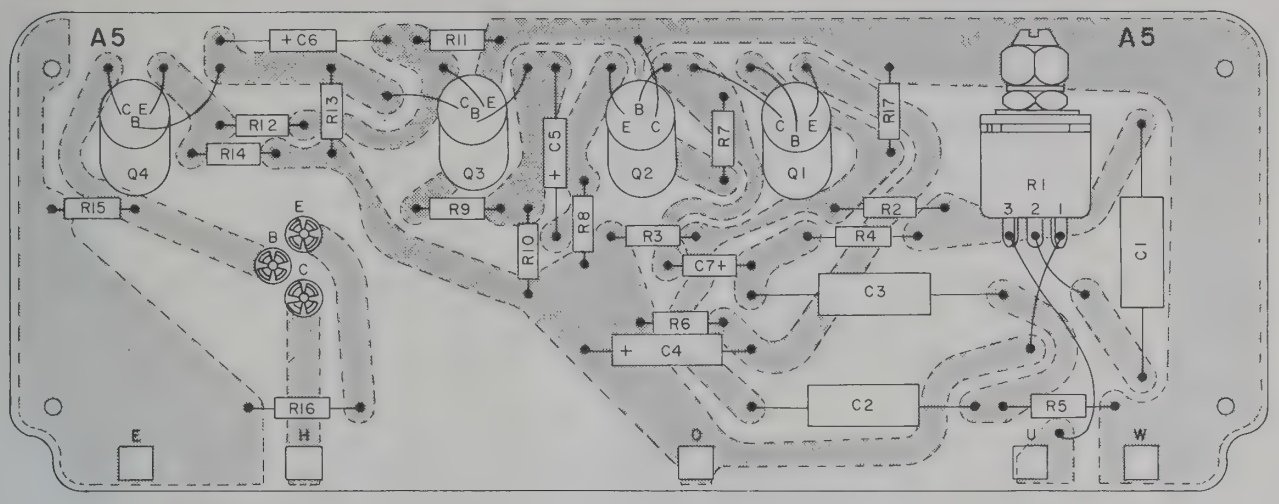


NOTES:
1. FOR CHASSIS WIRING DIAGRAM, SEE FIGURE 5-2.
2. FOR SCHEMATIC DIAGRAM, SEE FIGURE 5-1.
3. WIRES MARKED WITH COLOR NOTE ARE NO. 24 AWG STRANDED COPPER, TEFLON INSULATED.
4. SHADED AREAS DENOTE UNETCHED COPPER ON OPPOSITE SIDE OF PANEL.

Figure 5-6. ARC Type R-33A Receiver, A-f/AGC Module Wiring Diagram

22504A

VIEW FROM COMPONENT SIDE OF BOARD



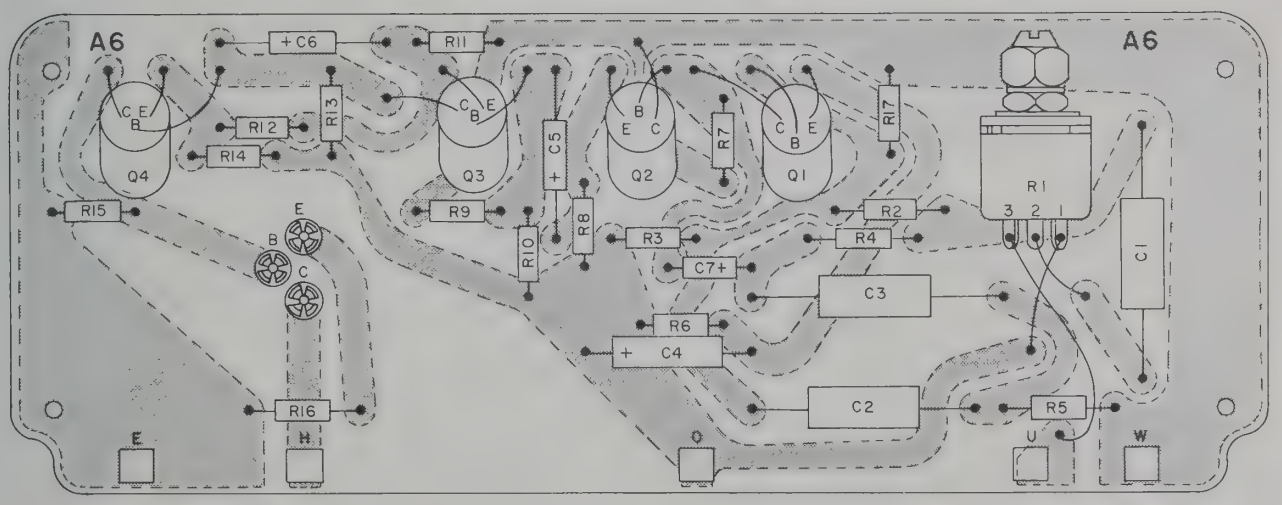
NOTES:

1. FOR CHASSIS WIRING DIAGRAM, SEE FIGURE 5-2.
2. FOR SCHEMATIC DIAGRAM, SEE FIGURE 5-1.
3. WIRES MARKED WITH COLOR NOTE ARE NO. 24 AWG STRANDED COPPER, TEFLON INSULATED. UNMARKED WIRES ARE NO. 24 AWG SOLID, TINNED COPPER.
4. SHADED AREAS DENOTE UNETCHED COPPER ON OPPOSITE SIDE OF PANEL.

Figure 5-7. ARC Type R-33A Receiver, 400-cps Module Wiring Diagram

22379A

VIEW FROM COMPONENT SIDE OF BOARD



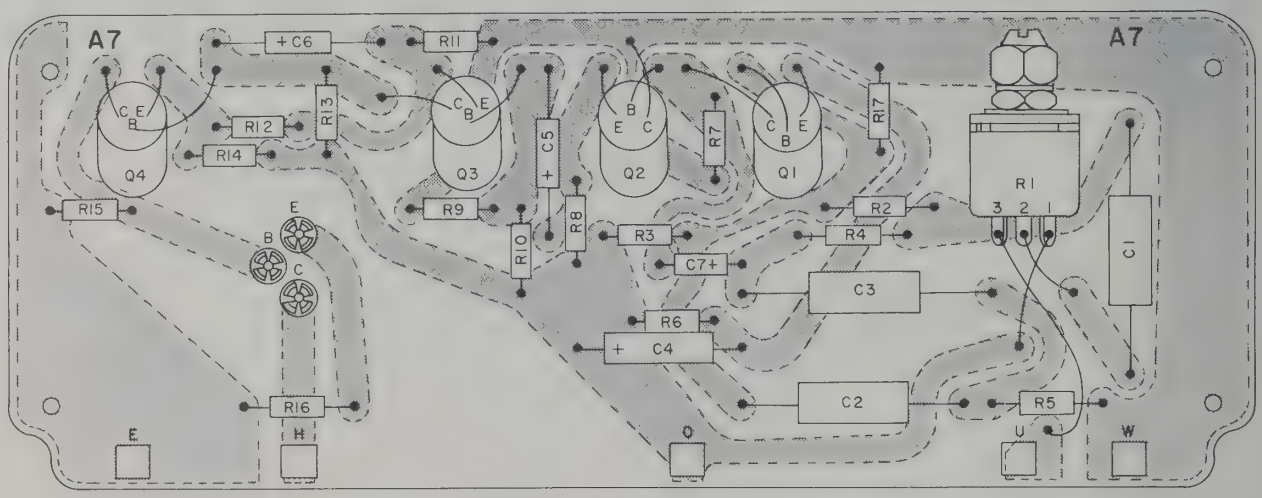
NOTES:

1. FOR CHASSIS WIRING DIAGRAM, SEE FIGURE 5-2.
2. FOR SCHEMATIC DIAGRAM, SEE FIGURE 5-1.
3. WIRES MARKED WITH COLOR NOTE ARE NO. 24 AWG STRANDED COPPER, TEFLON INSULATED. UNMARKED WIRES ARE NO. 24 AWG SOLID, TINNED COPPER.
4. SHADED AREAS DENOTE UNETCHED COPPER ON OPPOSITE SIDE OF PANEL.

Figure 5-8. ARC Type R-33A Receiver, 1300-cps Module Wiring Diagram

22380A

VIEW FROM COMPONENT SIDE OF BOARD



NOTES:

1. FOR CHASSIS WIRING DIAGRAM, SEE FIGURE 5-2.
2. FOR SCHEMATIC DIAGRAM, SEE FIGURE 5-1.
3. WIRES MARKED WITH COLOR NOTE ARE NO. 24 AWG STRANDED COPPER, TEFLON INSULATED. UNMARKED WIRES ARE NO. 24 AWG SOLID, TINNED COPPER.
4. SHADED AREAS DENOTE UNETCHED COPPER ON OPPOSITE SIDE OF PANEL.

Figure 5-9. ARC Type R-33A Receiver, 3000-cps Module Wiring Diagram

22381A

SECTION VI

PARTS LIST

TABLE 6-1. MANUFACTURERS' CODES

Code	Name and Address
AB	Allen Bradley Co. Milwaukee, Wisconsin
AMP	American Phenolic Corp. Chicago, Illinois
CLD	Cornell-Dubilier Electric Corp. South Plainfield, New Jersey
DABU	Dale Products, Inc. Columbus, Nebraska
DECN	Delevan Electronics Corp. East Aurora, New York
EMM	Electro Motive Mfg. Co. Willimantic, Connecticut
IPC	Industrial Products Co. Div. of Knudsen, Inc. Danbury, Connecticut
JFE	Jeffers Electronics Corp. Dubois, Pennsylvania
SLE	Sylvania Electric Products, Inc. Emporium, Pennsylvania
SPR	Sprague Electric Co. North Adams, Massachusetts
TI	Texas Instruments, Inc. Dallas, Texas

Reference Designation[1]	Description	ARC Part No.	Manufacturer & Part No.
	A1, R-F ASSEMBLY, ARC-22462		
C1	CAPACITOR, Fixed, ceramic, 0.01 μf ±20 per cent, 500 vdcw	8627(.01)	AB 36-103W
C2	CAPACITOR, Fixed, same as C1		
C3	CAPACITOR, Fixed, electrolytic, 1 μf ±20 per cent, 35 vdcw	21485(1)	SPR 150D268B1
C4	CAPACITOR, Fixed, same as C3		
C5	CAPACITOR, Fixed, electrolytic, 0.015 μf ±20 per cent, 500 vdcw	8627(.015)	SPR 40-153W
CR1	SEMICONDUCTOR DEVICE, Diode, type 1N82A	16964	
CR2	SEMICONDUCTOR DEVICE, Diode, 63.5 mc	19658(63.5)	
CR3	SEMICONDUCTOR DEVICE, Diode, 9.8 mc	19657(9.8)	
L1	CHOKE, RF, 6.8 μh ±10 per cent	8877(6.8)	JFE 10102-628
Q1	TRANSISTOR, Type 2N384	22636	
Q2	TRANSISTOR, Type 2N274	22541	
R1	RESISTOR, Fixed, comp, 100 ohms ±10 per cent, 1/4w	200(100)	AB CB1011
R2	RESISTOR, Fixed, comp, 6800 ohms ±10 per cent, 1/4w	200(6800)	AB CB6821
R3	RESISTOR, Fixed, comp, 2200 ohms ±10 per cent, 1/4w	200(2200)	AB CB2221
R4	RESISTOR, Fixed, comp, 220 ohms ±10 per cent, 1/4w	200(220)	AB CB2211
R5	RESISTOR, Fixed, comp, 1000 ohms ±10 per cent, 1/4w	200(1K)	AB CB1021
R6	RESISTOR, Fixed, same as R5		
R7	RESISTOR, Fixed, same as R5		
R8	RESISTOR, Fixed, same as R5		
R9	RESISTOR, Fixed, comp, 470 ohms ±10 per cent, 1/4w	200(470)	AB CB4711
R10	RESISTOR, Fixed, comp, 4700 ohms ±10 per cent, 1/4w	200(4700)	AB CB4721
R11	RESISTOR, Fixed, comp, 47 ohms ±10 per cent, 1/4w	200(47)	AB CB4701
T1	TRANSFORMER, Oscillator	22478	
Z1	FILTER	22549	
Z2	FILTER	22460	
	A2, MIXER ASSEMBLY, ARC-22463		
C1	CAPACITOR, Fixed, electrolytic, 1 μf ±20 per cent, 35 vdcw	21485(1.0)	SPR 150D268B1
C2	CAPACITOR, Fixed, mica, 1000 μμf ±5 per cent, 500 vdcw	8908(1000)	EMM VTDM-19-1000
C3	CAPACITOR, Fixed, same as C1		
C4	CAPACITOR, Fixed, same as C1		
C5	CAPACITOR, Fixed, same as C1		
C6	CAPACITOR, Fixed, same as C1		
CR1	SEMICONDUCTOR DEVICE, Diode, type 1N462	17633	
CR2	SEMICONDUCTOR DEVICE, same as CR1		
Q1	TRANSISTOR, Type 2N274	22541	
R1	RESISTOR, Fixed, comp, 2200 ohms, ±10 per cent, 1/4w	200(2200)	AB CB2221

[1]Reference designations are abbreviated; for complete identification, prefix with applicable assembly designation.

Reference Designation[1]	Description	ARC Part No.	Manufacturer & Part No.
R2	RESISTOR, Fixed, comp, 1000 ohms ±10 per cent, 1/4w	200(1K)	AB CB1021
R3	RESISTOR, Fixed, comp, 47,000 ohms ±10 per cent, 1/4w	200(47K)	AB CB4731
R4	RESISTOR, Fixed, comp, 47 ohms ±10 per cent, 1/4w	200(47)	AB CB4701
R5	RESISTOR, Variable, comp, 0-1000 ohms ±20 per cent, 0.33w	8915(1000)	AB GLU1022SD3028L
R6	RESISTOR, Fixed, comp, 3300 ohms ±10 per cent, 1/4w	200(3300)	AB CB3321
R7	RESISTOR, Variable, comp, 0-250 ohms ±20 per cent, 0.33w	8915(250)	AB GLU2512SD3028L
R8	RESISTOR, Fixed, same as R2		
R9	RESISTOR, Fixed, same as R1		
R10	RESISTOR, Fixed, comp, 1500 ohms ±10 per cent, 1/4w	200(1500)	AB CB1521
R11	RESISTOR, Fixed, comp, 1200 ohms ±5 per cent, 1/2w	201(1200)	AB EB1225
Z1	FILTER ASSEMBLY	22461	
	A3, I-F ASSEMBLY, ARC-22464		
C1	CAPACITOR, Fixed, electrolytic, 1 μf ±20 per cent, 35 vdcw	21485(1)	SPR 150D268B1
C2	CAPACITOR, Fixed, same as C1		
C3	CAPACITOR, Fixed, same as C1		
C4	CAPACITOR, Fixed, same as C1		
C5	CAPACITOR, Fixed, electrolytic, 60 μf ±20 per cent, 6 vdcw	8918(60)	SPR 150D60B1
C6	CAPACITOR, Fixed, same as C1		
C7	CAPACITOR, Fixed, same as C1		
C8	CAPACITOR, Fixed, same as C1		
C9	CAPACITOR, Fixed, same as C1		
C10	CAPACITOR, Fixed, same as C1		
C11	CAPACITOR, Fixed, same as C1		
C12	CAPACITOR, Fixed, same as C1		
C13	CAPACITOR, Fixed, mica, 68 μμf ±5 per cent, 500 vdcw	8870(68)	EMM VTDM-15-68
C14	CAPACITOR, Fixed, same as C1		
C15	CAPACITOR, Fixed, ceramic, 0.01 μf ±20 per cent, 500 vdcw	8627(.01)	AB 36-103W
C16	CAPACITOR, Fixed, mica, 0.015 μf ±5 per cent, 500 vdcw	8908(.015)	EMM VTDM-19-.015
C17	CAPACITOR, Fixed, same as C13		
C18	CAPACITOR, Fixed, same as C15		
C19	CAPACITOR, Fixed, same as C1		
C20	CAPACITOR, Fixed, same as C1		
L1	CHOKE, RF, 68 μh ±10 per cent	8922(68)	DECN 3500-04
L2	CHOKE, Same as L1		
L3	CHOKE, Same as L1		
L4	CHOKE, RF, 89 μh ±2 per cent	22373	
Q1	TRANSISTOR, Type 2N274	22541	
Q2	TRANSISTOR, Same as Q1		
Q3	TRANSISTOR, Same as Q1		
Q4	TRANSISTOR, Same as Q1		
Q5	TRANSISTOR, Same as Q1		
R1	RESISTOR, Fixed, comp, 150 ohms ±10 per cent, 1/4w	200(150)	AB CB1511

[1]Reference designations are abbreviated; for complete identification, prefix with applicable assembly designation.

Reference Designation[1]	Description	ARC Part No.	Manufacturer & Part No.
R2	RESISTOR, Fixed, same as R1		
R3	RESISTOR, Fixed, comp, 470 ohms ±10 per cent, 1/4w	200(470)	AB CB4711
R4	RESISTOR, Fixed, comp, 100 ohms ±10 per cent, 1/4w	200(100)	AB CB1011
R5	RESISTOR, Fixed, comp, 330 ohms ±10 per cent, 1/4w	200(330)	AB CB3311
R6	RESISTOR, Fixed, comp, 3300 ohms ±10 per cent, 1/4w	200(3300)	AB CB3321
R7	RESISTOR, Fixed, same as R3		
R8	RESISTOR, Fixed, same as R3		
R9	RESISTOR, Fixed, same as R3		
R10	RESISTOR, Fixed, same as R6		
R11	RESISTOR, Fixed, comp, 4700 ohms ±10 per cent, 1/4w	200(4700)	AB CB4721
R12	RESISTOR, Fixed, comp, 220 ohms ±10 per cent, 1/4w	200(220)	AB CB2211
R13	RESISTOR, Fixed, same as R12		
R14	RESISTOR, Fixed, comp, 47 ohms ±10 per cent, 1/4w	200(47)	AB CB4701
R15	RESISTOR, Fixed, comp, 1000 ohms ±10 per cent, 1/4w	200(1K)	AB CB1021
R16	RESISTOR, Fixed, same as R12		
R17	RESISTOR, Fixed, same as R12		
R18	RESISTOR, Fixed, same as R12		
R19	RESISTOR, Fixed, comp, 2200 ohms ±10 per cent, 1/4w	200(2200)	AB CB2221
R20	RESISTOR, Fixed, same as R19		
	A4, AUDIO AND AGC ASSEMBLY, ARC-22465		
C1	CAPACITOR, Fixed, electrolytic, 1 μf ±20 per cent, 35 vdcw	21485(1)	SPR 150D268B1
C2	CAPACITOR, Fixed, electrolytic, 60 μf ±20 per cent, 6 vdcw	8918(60)	SPR 150D60B1
C3	CAPACITOR, Fixed, same as C2		
C4	CAPACITOR, Fixed, ceramic 0.01 μf ±20 per cent, 500 vdcw	8627(.01)	AB 36-103W
C5	CAPACITOR, Fixed, same as C2		
C6	CAPACITOR, Fixed, electrolytic, 0.047 μf ±20 per cent, 35 vdcw	21485(.047)	SPR 150D254B1
C7	CAPACITOR, Fixed, same as C2		
C8	CAPACITOR, Fixed, same as C1		
L1	CHOKE, RF, 68 μh ±10 per cent	8922(68)	DECN 3500-04
L2	CHOKE, RF, 150 μh ±10 per cent	8922(150)	DECN 3500-12
Q1	TRANSISTOR	20638	TI 904NPN
Q2	TRANSISTOR, Same as Q1		
Q3	TRANSISTOR, Type 2N274	22541	
Q4	TRANSISTOR, Type 2N270	22635	
Q5	TRANSISTOR	22542	
Q6	TRANSISTOR, Same as Q5		
R1	RESISTOR, Fixed, comp, 100 ohms ±10 per cent, 1/4w	200(100)	AB CB1011
R2	RESISTOR, Fixed, comp, 10,000 ohms ±10 per cent, 1/4w	200(10K)	AB CB1031
R3	RESISTOR, Fixed, comp, 22,000 ohms ±10 per cent, 1/4w	200(22K)	AB CB2231
R4	RESISTOR, Fixed, same as R2		
R5	RESISTOR, Fixed, comp, 2200 ohms ±10 per cent, 1/4w	200(2200)	AB CB2221
R6	RESISTOR, Fixed, comp, 6800 ohms ±10 per cent, 1/4w	200(6800)	AB CB6821

[1] Reference designations are abbreviated; for complete identification, prefix with applicable assembly designation.

Reference Designation[1]	Description	ARC Part No.	Manufacturer & Part No.
R7	RESISTOR, Fixed, same as R5		
R8	RESISTOR, Fixed, comp, 4700 ohms ±10 per cent, 1/4w	200(4700)	AB CB4721
R9	RESISTOR, Fixed, comp, 470 ohms ±10 per cent, 1/4w	200(470)	AB CB4711
R10	RESISTOR, Fixed, same as R9		
R11	RESISTOR, Fixed, same as R1		
R12	RESISTOR, Fixed, comp, 3300 ohms ±10 per cent, 1/4w	200(3300)	AB CB3321
R13	RESISTOR, Fixed, comp, 220 ohms ±10 per cent, 1/4w	200(220)	AB CB2211
R14	RESISTOR, Fixed, comp, 330 ohms ±10 per cent, 1/4w	200(330)	AB CB3311
R15	RESISTOR, Fixed, same as R12		
R16	RESISTOR, Fixed, same as R12		
R17	RESISTOR, Fixed, comp, 10 ohms ±5 per cent, 1/2w	201(10)	AB EB1005
R18	RESISTOR, Fixed, same as R17		
T1	TRANSFORMER, Output	22494	SLE 25401
T2	TRANSFORMER, Output	23102	SLE 26251
	A5, 400-CPS LIGHT ASSEMBLY, ARC-22466		
C1	CAPACITOR, Fixed, plastic, 0.1 μf ±5 per cent, 50 vdcw	8802	CLD TWMA1P1-5-5
C2	CAPACITOR, Fixed, same as C1		
C3	CAPACITOR, Fixed, same as C1		
C4	CAPACITOR, Fixed, electrolytic, 60 μf ±20 per cent, 6 vdcw	8918(60)	SPR 150D60B1
C5	CAPACITOR, Fixed, electrolytic, 10 μf ±20 per cent, 20 vdcw	8914(10)	SPR 150D200B1
C6	CAPACITOR, Fixed, same as C5		
C7	CAPACITOR, Fixed, electrolytic, 1 μf ±20 per cent, 35 vdcw	21485(1.0)	SPR 150D268B1
Q1	TRANSISTOR, Type 2N217	22293	
Q2	TRANSISTOR, Same as Q1		
Q3	TRANSISTOR, Type 2N647	22442	
Q4	TRANSISTOR, Same as Q1		
Q5	TRANSISTOR	22441	
R1	RESISTOR, Variable, comp, 0-100 ohms ±20 per cent, 0.33w	8915(100)	AB GLU100SD3028L
R2	RESISTOR, Fixed, comp, 6800 ohms ±5 per cent, 1/2w	201(6800)	AB EB6825
R3	RESISTOR, Fixed, comp, 1000 ohms ±10 per cent, 1/4w	200(1K)	AB CB1021
R4	RESISTOR, Fixed, same as R2		
R5	RESISTOR, Fixed, comp, 1200 ohms ±5 per cent, 1/2w	201(1200)	AB EB1225
R6	RESISTOR, Fixed, same as R3		
R7	RESISTOR, Fixed, comp, 6800 ohms ±10 per cent, 1/4w	200(6800)	AB CB6821
R8	RESISTOR, Fixed, same as R3		
R9	RESISTOR, Fixed, comp, 470 ohms ±10 per cent, 1/4w	200(470)	AB CB4711
R10	RESISTOR, Fixed, same as R7		
R11	RESISTOR, Fixed, comp, 150 ohms ±10 per cent, 1/4w	200(150)	AB CB1511
R12	RESISTOR, Fixed, comp, 1200 ohms ±10 per cent, 1/4w	200(1200)	AB CB1221
R13	RESISTOR, Fixed, comp, 2200 ohms ±10 per cent, 1/4w	200(2200)	AB CB2221

[1]Reference designations are abbreviated; for complete identification, prefix with applicable assembly designation.

Reference Designation[1]	Description	ARC Part No.	Manufacturer & Part No.
R14	RESISTOR, Fixed, same as R3		
R15	RESISTOR, Fixed, comp, 100 ohms ±10 per cent, 1/4w	200(100)	AB CB1011
R16	RESISTOR, Fixed, comp, 10 ohms ±5 per cent, 1/2w	201(10)	AB EB1005
R17	RESISTOR, Fixed, comp, 10,000 ohms ±10 per cent, 1/4w	200(10K)	AB CB1031
	A6, 1300-CPS ASSEMBLY, ARC-22467		
C1	CAPACITOR, Fixed, plastic, 0.022 μf ±5 per cent, 200 vdcw	8804(.022)	CLD 4S22-5-5
C2	CAPACITOR, Fixed, same as C1		
C3	CAPACITOR, Fixed, same as C1		
C4	CAPACITOR, Fixed, electrolytic, 60 μf ±20 per cent, 6 vdcw	8918(60)	SPR 150D60B1
C5	CAPACITOR, Fixed, electrolytic, 1.0 μf ±20 per cent, 35 vdcw	21485(1)	SPR 150D268B1
C6	CAPACITOR, Fixed, same as C5		
C7	CAPACITOR, Fixed, same as C5		
Q1	TRANSISTOR, Type 2N217	22293	
Q2	TRANSISTOR, Same as Q1		
Q3	TRANSISTOR, Type 2N647	22442	
Q4	TRANSISTOR, Same as Q1		
Q5	TRANSISTOR	22441	
R1	RESISTOR, Variable, comp, 0-100 ohms ±20 per cent, 0.33w	8915(100)	AB GLU100SD3028L
R2	RESISTOR, Fixed, comp, 11,000 ohms ±5 per cent, 1/2w	201(11K)	AB EB1135
R3	RESISTOR, Fixed, comp, 1000 ohms ±10 per cent, 1/4w	200(1K)	AB CB1021
R4	RESISTOR, Fixed, same as R2		
R5	RESISTOR, Fixed, comp, 1300 ohms ±5 per cent, 1/2w	201(1300)	AB EB1325
R6	RESISTOR, Fixed, same as R3		
R7	RESISTOR, Fixed, comp, 6800 ohms ±10 per cent, 1/4w	200(6800)	AB CB6821
R8	RESISTOR, Fixed, same as R3		
R9	RESISTOR, Fixed, comp, 470 ohms ±10 per cent, 1/4w	200(470)	AB CB4711
R10	RESISTOR, Fixed, same as R7		
R11	RESISTOR, Fixed, comp, 150 ohms ±10 per cent, 1/4w	200(150)	AB CB1501
R12	RESISTOR, Fixed, comp, 1200 ohms ±10 per cent, 1/4w	200(1200)	AB CB1221
R13	RESISTOR, Fixed, comp, 2200 ohms ±10 per cent, 1/4w	200(2200)	AB CB2221
R14	RESISTOR, Fixed, same as R3		
R15	RESISTOR, Fixed, comp, 100 ohms ±10 per cent, 1/4w	200(100)	AB CB1011
R16	RESISTOR, Fixed, comp, 10 ohms ±5 per cent, 1/2w	201(10)	AB EB1005
R17	RESISTOR, Fixed, comp, 10,000 ohms ±10 per cent, 1/4w	200(10K)	AB CB1031
	A7, 3000-CPS LIGHT ASSEMBLY, ARC-22468		
C1	CAPACITOR, Fixed, paper, 0.01 μf ±5 per cent, 400 vdcw	8907(.01)	SPR 196P10354S4
C2	CAPACITOR, Fixed, same as C1		
C3	CAPACITOR, Fixed, same as C1		

[1]Reference designations are abbreviated; for complete identification, prefix with applicable assembly designation.

Reference Designation[1]	Description	ARC Part No.	Manufacturer & Part No.
C4	CAPACITOR, Fixed, electrolytic, 60 μf ±20 per cent, 6 vdcw	8918(60)	SPR 150D60B1
C5	CAPACITOR, Fixed, electrolytic, 1.0 μf ±20 per cent, 35 vdcw	21485(1)	SPR 150D268B1
C6	CAPACITOR, Fixed, same as C5		
C7	CAPACITOR, Fixed, same as C5		
Q1	TRANSISTOR, Type 2N217	22293	
Q2	TRANSISTOR, Same as Q1		
Q3	TRANSISTOR, Type 2N467	22442	
Q4	TRANSISTOR, Same as Q1		
Q5	TRANSISTOR	22441	
R1	RESISTOR, Variable, comp, 0-100 ohms ±20 per cent, 0.33w	8915(100)	AB GLU100SD3028L
R2	RESISTOR, Fixed, comp, 12,000 ohms ±5 per cent, 1/2w	201(12K)	AB EB1235
R3	RESISTOR, Fixed, comp, 1000 ohms ±10 per cent, 1/4w	200(1K)	AB CB1021
R4	RESISTOR, Fixed, same as R2		
R5	RESISTOR, Fixed, comp, 1000 ohms ±5 per cent, 1/2w	201(1K)	AB EB1025
R6	RESISTOR, Fixed, same as R3		
R7	RESISTOR, Fixed, comp, 6800 ohms ±10 per cent, 1/4w	200(6800)	AB CB6821
R8	RESISTOR, Fixed, same as R3		
R9	RESISTOR, Fixed, comp, 470 ohms ±10 per cent, 1/4w	200(470)	AB CB4721
R10	RESISTOR, Fixed, same as R7		
R11	RESISTOR, Fixed, comp, 150 ohms ±10 per cent, 1/4w	200(150)	AB CB1511
R12	RESISTOR, Fixed, comp, 1200 ohms ±10 per cent, 1/4w	200(1200)	AB CB1221
R13	RESISTOR, Fixed, comp, 2200 ohms ±10 per cent, 1/4w	200(2200)	AB CB2221
R14	RESISTOR, Fixed, same as R3		
R15	RESISTOR, Fixed, comp, 100 ohms ±10 per cent, 1/4w	200(100)	AB CB1011
R16	RESISTOR, Fixed, comp, 10 ohms ±5 per cent, 1/2w	201(10)	AB EB1005
R17	RESISTOR, Fixed, comp, 10,000 ohms ±10 per cent, 1/4w	200(10K)	AB CB1031
	A8, CHASSIS ASSEMBLY, ARC-21900		
C1	CAPACITOR, Fixed, electrolytic, 150 μf ±20 per cent, 15 vdcw	8920(150)	SPR 150D157X0015S
C2	CAPACITOR, Fixed, ceramic, 0.01 μf ±20 per cent, 500 vdcw	8627(.01)	AB 36-103W
C3	CAPACITOR, Fixed, same as C2		
C4	CAPACITOR, Fixed, same as C2		
CR1	SEMICONDUCTOR DEVICE, Diode, type 1N1351	22298(1N1351)	
J1	CONNECTOR, Receptacle, electrical	21768	AMP 94-21320
J2	CONNECTOR, Receptacle, electrical	11338	IPC 87000
L1	CHOKE, RF, 47 μh	8926(47)	DECN 2890-36
R1	RESISTOR, Fixed, WW, 50 ohms ±3 per cent, 25w	340(50)	DABU RH-25-50
R2	RESISTOR, Fixed, comp, 12 ohms ±5 per cent, 2w	203(12)	AB HB1205
R3	RESISTOR, Variable, comp, 0-2500 ohms ±20 per cent, 0.33w	8915(2500)	AB GLU2522SD3028L
W1	CABLE ASSEMBLY	20469	

[1]Reference designations are abbreviated; for complete identification, prefix with applicable assembly designation.

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